UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

4/12/2011

REPLY TO THE ATTENTION OF:

Keith Nagel
Manager, Environmental Affairs
ArcelorMittal Indiana Harbor
4020 Kinross Lakes Parkway
Richfield, Ohio 44286-9000

Re: Arcelor Mittal Screening Level Ecological Risk Assessment (SLERA) Work Plan
RCRA 3013 Monitoring, Testing, Analysis and Reporting

Dear Mr. Nagel:

We have completed our review of the March 9,2011 Response to U.S. EPA Comment Letter Dated May 27, 2010 on the Screening Level Ecological Risk Assessment Work Plan for the Former Coke Plant (SLERA Work Plan) for the ArcelorMittal Indiana Harbor Facility in East Chicago, Indiana. In the May 2010 letter, we issued a conditional approval to ArcelorMittal contingent on further revision of the SLERA work Plan. You have failed to provide the necessary revisions to the SLERA Work Plan and instead provided the following reasons:

- Interlocking sheet pile walls in the IHC prevent discharge of contaminated Groundwater;
- The IHC is an unnatural setting with high sheet pile walls and has a negligible or extremely limited benthic community due to historical impacts to sediments and the deep water environment;
- The sheet pile walls and deep water environment prevent wildlife from feeding on benthic invertebrates.

Although EPA continues to disagree with your reasoning, ArcelorMittal may proceed with the implementation of the May 2010 SLERA Work Plan. If ongoing hydrogeologic investigations support ArcelorMittal's contention that contaminated groundwater is not being discharged to the Indiana Harbor Canal (IHC) or discharge does not occur through bottom sediments), then the methods described in the SLERA Work Plan are expected to be adequately protective. However, if hydrogeologic investigations at the former coke plant indicate that groundwater is, in fact, discharging to bottom sediments in the IHC, then ArcelorMittal must develop more realistic risk estimates to evaluate the potential for risk from contaminated groundwater to receptors in the Intake Flume and/or the IHC. Again as we indicated in May 2010 letter, ArcelorMittal must also

tabulate all relevant exposure parameters and toxicity values in the SLERA, and EPA will review and comment on these values when the SLERA is submitted.

If you have any further questions or concerns please contact me at (312) 886-7954.

Sincerely,

Jonathan Adenuga
U.S. EPA Project Manager

Bcc: Christine Liszewski, ORC
Cc: Frances Hodges, Booz Allen

ArcelorMittal

March 9, 2011

Mr. Jonathan Adenuga
U.S. EPA – Region 5
77 West Jackson Boulevard; LU-9H
Chicago, IL 60604-3590

Re: Response to U.S. EPA Comment Letter Dated May 27, 2010 on the Screening Level Ecological Risk Assessment (SLERA) Work Plan for the Former Coke Plant
RCRA 3013 Administrative Order IND 005 462 601

Dear Mr. Adenuga:

ArcelorMittal received the U.S. EPA comment letter dated May 27, 2010. The purpose of this letter is to transmit our responses to those comments on the SLERA work plan for the former Coke Plant. In our response to your comments, your original comments are shown in italics and our response is provided below.

If you have any questions, please contact Tom Barnett at Indiana Harbor at 219.391.2380.

Sincerely,

Keith Nagel
Director, Environmental Affairs and Real Estate
ArcelorMittal USA

1. is an unnatural setting because the canal is channelized with sheet piled walls;
2. has a negligible or extremely limited benthic community due to the presence of historically impacted sediments (US Fish and Wildlife Service, 2000);
3. has high sheet pile walls and the absence of shallow mudflats in the vicinity of the former Coke Plant do not allow birds or small mammals to feed upon benthic invertebrates that might be present in the canal sediments;
4. is channelized which creates a deep water (20-25 feet) environment that limits the contact between terrestrial species and benthic organisms; and lastly,
5. has interlocking sheet pile walls which significantly limit/essentially eliminate groundwater discharge directly to the canal sediments. Thus, there is no transition zone (i.e., sediment/groundwater interface) at the bottom of the canal due to the presence of the interlocking sheet pile walls.

- *Add Measure of Effect 6 - The SLERA Work Plan should be revised to include additional measure(s) of effect to evaluate risks from contaminated groundwater discharge to higher trophic level fish. Again, uptake from discharging groundwater to benthic organisms must be considered. Refer to Specific Comment 4 in EPA's November 19, 2009 comments for specific recommendations.*

Response:
No revisions to the existing work plan are needed. As stated previously, there is little to no "benthic community" due to the depth of the canal and the sheet-pile wall lining. Further groundwater is not discharging at the sediment interface because of the interlocking sheet pile wall. This endpoint could be considered in a BERA if the SLERA indicates additional evaluation of the fish community is warranted. See also the response to the previous bullet item for further documentation why "additional measure(s) of effects..." will not be considered in the SLERA.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

5/27/2010
Keith Nagel
Manager, Environmental Affairs
ArcelorMittal Indiana Harbor
4020 Kinross Lakes Parkway
Richfield, Ohio 44286-9000

Re: Arcelor Mittal Screening Level Ecologigal Risk Assessment (SLERA) Work
RCRA 3013 Monitoring, Testing, Analysis and Reporting

Dear Mr. Nagel:

We have completed our review of the February 26, 2010 *Response to Comments on the Screening Level Ecological Risk Assessment (SLERA) Work Plan* and the January 2010 *SLERA Work Plan for the Former Coke Plant, Revision 2*, at the ArcelorMittal Indiana Harbor Facility in East Chicago, Indiana. The review focused on evaluating the technical adequacy of the facility's responses to comments previously provided by EPA in a letter dated November 19, 2009. The work plan was conditionally approved on November 11, 2009. As discussed in several previous comments (e.g., Specific Comment 7 of May 7, 2009 EPA comments; Specific Comments 4 and 5 of November 19, 2009 EPA comments), EPA has concerns regarding the adequacy of ArcelorMittal's proposed procedures for evaluating risk from discharge of contaminated groundwater to surface water and sediments through the aquatic food web pathway to higher trophic level fish and wildlife receptors. The January 2010 Revised SLERA Work Plan does not fully address these concerns. Accordingly, EPA recommends the following additional revisions to Section 2.3 of the SLERA Work Plan:

- *Assessment Endpoint 5* – Revise text from, "Maintenance of vertebrate wildlife communities…", to "Maintenance of higher trophic level fish and wildlife communities…".
- *Measure of Effect 5* – The method for estimating uptake of groundwater contaminants to prey based on applying a dilution attenuation factor (DAF) to estimate surface water concentrations may result in underestimated exposure, which should be avoided in a SLERA. Benthic organisms may be exposed to higher concentrations of contaminants in transition zone water, resulting in greater uptake of contaminants to these benthic organisms and the higher trophic level organisms that feed on them. The SLERA Work Plan should be revised to estimate prey concentrations in a manner that does not underestimate uptake from transition zone water to benthic and higher trophic level organisms through the food web. A worst-case method would be to apply

bioaccumulation factors to groundwater concentrations at the point of discharge rather than to surface water estimated from groundwater concentrations by application of a DAF, but other, more realistic methods could be considered if supporting data are available. In lieu of groundwater concentrations at the point of discharge, available concentration data from the closest groundwater point would be appropriate for a screening level assessment. A pragmatic approach might be to first calculate risks using this worst-case method, and develop alternative methods later if these calculations result in hazard quotients greater than one.

- Add *Measure of Effect 6* – The SLERA Work Plan should be revised to include additional measure(s) of effect to evaluate risks from contaminated groundwater discharge to higher trophic level fish. Again, uptake from discharging groundwater to benthic organisms must be considered. Refer to Specific Comment 4 in EPA's November 19, 2009 comments for specific recommendations.

We also recommend that EPA review ArcelorMittal's responses to Specific Comments 2 and 4 prior to approval of the Revised SELRA Work Plan. In response to Specific Comment 2, ArcelorMittal indicates that, due to recent remedial actions at the Clark Landfill, terrestrial habitat is no longer present and further SLERA evaluation of the Clark Landfill will not be conducted until groundwater data have been collected and evaluated against data quality Objectives (DQOs). Based on the limited description of the cap placed on the Clark Landfill, it appears that exposure pathways to terrestrial receptors are no longer complete, but Booz Allen would like to verify EPA's concurrence on this issue.

Regarding the response to Specific Comment 4, ArcelorMittal indicates that in an April 27, 2004 letter, EPA agreed that sampling of surface water and sediment in the Intake Flume and the Indiana Harbor Canal is not required. The exact language included in EPA's April 27, 2004 letter is, "First, ISG and Tecumseh may eliminate sediment and surface water sampling at any location other than the real property owned by ISG and Tecumseh." Booz Allen recommends that EPA review ArcelorMittal's response to Specific Comment 4 to ensure concurrence. We also note that ArcelorMittal plans to conduct a screening-level assessment to evaluate the potential for risk from contaminated groundwater to receptors in the Intake Flume and/or the Indiana Harbor Canal; however, if the SLERA does indicate risk from discharging groundwater to receptors in these water bodies, it may be difficult or impossible to develop refined, more realistic risk estimates without collecting sediment, surface water, or tissue residue samples.

Booz Allen recommends that EPA issue a conditional approval of the Revised SLERA Work Plan, requiring completion of the above-listed recommended revisions. The approval letter should note that ArcelorMittal will tabulate all relevant exposure parameters and toxicity values in the SLERA, and EPA will review and comment on these values when the SLERA is submitted. If you have any questions regarding this deliverable, please contact me at (312) 578-4757 or Jennifer Nystrom at (828) 278-0329.

Sincerely,

Frances B. Hodge

If you have any further questions or concerns please contact me at (312) 886-7954.

Sincerely,

Jonathan Adenuga
U.S. EPA Project Manager

Enclosure
bcc: Christine Liszewski

February 26, 2010

ArcelorMittal

Mr. Jonathan Adenuga
U.S. EPA – Region 5
77 West Jackson Boulevard; LU-9J
Chicago, IL 60604-3590

Re: Response to Comments for the U.S. EPA Letter Dated November 19, 2009 on the Screening Level Ecological Risk Assessment (SLERA) Work Plan
RCRA 3013 Administrative Order IND 005 462 601
AECOM Project No. 60139026

Dear Mr. Adenuga:

ArcelorMittal received the U.S. EPA comment letter dated November 19, 2009 on November 23, 2009. The purpose of this letter is to transmit our responses to comments and provide a final work plan for a SLERA at the former Coke Plant. In our response to comments, your original comments are shown in italics and our responses are provided below each comment. The attached responses to comments have been incorporated into the revised work plan which is also attached.

Please note that the revised SLERA work plan addresses the former Coke Plant only. We are not providing a revised work plan for the Clark Landfill because the landfill has no terrestrial habitat (the entire site was recently regraded and capped with an IDEM-approved landfill cover) and we have no groundwater data at this time for a SLERA to be completed. Until a release of a hazardous waste constituent or a substantial hazard has been identified related to groundwater quality, it is premature to complete any SLERA activity at the Clark Landfill.

Five copies of the former Coke Plant work plan are provided for your use. The work plan includes the revisions noted in the response to comments attached to this letter.

If you have any questions, please contact me @ 219.391.2380.

Sincerely,

Thomas Barnett
Manager, Environmental Technology
ArcelorMittal Indiana Harbor, LLC

Attachments: Response to US EPA Comments Dated 11-19-09
Five copies of the revised Screening Level Ecological Risk Assessment for the former Coke Plant-Revision 2

cc: Dale Papajcik, SSD w/ revised work plan
Kevin Doyle, ArcelorMittal w/ revised work plan
Keith Nagel, ArcelorMittal w/ revised work plan
Tina Archer, ArcelorMittal w/ revised work plan

GENERAL COMMENTS

1. *EPA's General Comment 1 on the December 2008 version of the workplan requested clarification of the procedures for performing the SLERA, specifically in the selection of chemicals of potential ecological concern (COPECs) and the calculation of hazard quotients for the COPECs. The September 2009 revised workplan rearranged some text that partially helped clarify the respective procedures; however, the revised text is still somewhat confusing. Specifically, confusion arises in comparison of Section 2.4, where ecological screening levels are used to identify the COPECs for aquatic and terrestrial habitats, with Section 3.0 where the same screening levels and COPECs are used to calculate hazard quotients. In addition, Section 4.1 repeats the calculation method for determining a COPEC, again mentioning the screening levels. It would be helpful to clarify in these sections, including Section 4.1, that Section 2.4 first identifies COPECs through a screening process that compares maximum concentrations in environmental media with ecological screening levels, and that Section 3 then evaluates potential risks for those COPECs using the same ecological screening levels for lower trophic receptors; and then for higher trophic receptors through food chain modeling of the COPECs.*

Response

COPECs are identified in Section 2.4 based on media (e.g., soil, surface water) comparisons to ecological benchmarks. Sections 3 and 4 discuss the magnitude of the benchmark exceedances, evaluate COPECs through the food chain model, and characterize the risk assessment findings.

Additional text has been added to Section 3.2 and 4.1 in both work plans to clarify that the COPECs identified in Section 2.4 will be evaluated through media comparisons against ecological screening values (for lower trophic level receptors) or through food web modeling (for higher trophic level wildlife receptors). A copy of the revised work plan is attached.

2. *The September 2009 SLERA Work Plan does not include all parameters that will be needed to complete SLERA risk calculations (e.g., bioaccumulation factors and toxicity reference values are omitted). EPA will review and comment on all such parameters when the SLERA is submitted. Alternatively, if Arcelor Mittal would prefer to obtain approval of all parameters prior to performing risk calculations; then the omitted parameters should be submitted in either a revised workplan or a technical memorandum.*

Response

Bioaccumulation factors and toxicity reference factors will be identified in the SLERA once the COPECs have been identified.

SPECIFIC COMMENTS

Section 2.1.1, Terrestrial Environment
Section 2.2.1, Potential Exposure to Impacted Soil

1. *The September 2009 workplan has been revised from the draft version of December 2008 to include a brief description of construction activities at the former Coke Plant property that appear to reduce or eliminate exposures to terrestrial organisms. The draft workplan identified the terrestrial habitat of the Coke Plant property as presenting a potentially complete exposure pathway to terrestrial organisms. Subsequent construction activities consisted of grading and cover of the Coke Plant property with clean granular fill which was performed after submission and review of the draft version of the workplan. Because of these construction activities, it appears the former Coke Plant does not present a complete*

exposure route to terrestrial organisms. Nonetheless, the SLERA should include an evaluation of this potential exposure pathway, based on the planned site visit and the recent construction activities, to clearly demonstrate its lack of completeness.

Response

Section 2.2.1 indicates that the site visit will evaluate the presence or absence of the terrestrial exposure pathway and the SLERA will document this determination. Section 2.2.3 also identifies the exposure pathways that will be evaluated if the site visit identifies the potential for ecological exposure to surface soils at the former Coke Plant. As such, edits to the work plan relative to this comment are not warranted.

2. *Similarly, the revised workplan describes the Clark Landfill as having been regraded and capped as part of the landfill closure, subsequent to submission of the draft workplan and its review by EPA. The unvegetated surface layer is described as a limestone aggregate that serves to prevent erosion, but also may eliminate exposures to any terrestrial habitat at the landfill. As with the former Coke Plant property, the SLERA should include an evaluation of potential exposure pathways to the terrestrial environment at the Clark Landfill in light of the recent activities to demonstrate lack of a complete exposure pathway.*

Response

The discussions in Section 2.1.1 and 2.2.1 regarding the presence of geotextile and the layer of limestone aggregate at the Clark Landfill are consistent with the November 2008 version of the work plan. There is no habitat of significance on the recently capped landfill where the cap consists of coarse stone aggregate (i.e., no soil). Thus, there are no terrestrial exposures. Photographs have been provided in the previous work plan to document this fact. Futher SLERA evaluation of the Clark Landfill is not planned until groundwater data has been collected and evaluated against DQOs.

Section 2.1.2, Aquatic Environment

3. *EPA Specific Comment 2 on the December 2008 workplan requested that the workplan include an evaluation of the pathway of groundwater discharge at the former Coke Plant to the Indiana Harbor Canal, based on results of an EPA review of the November 2008 groundwater flow maps. The response to the comment provided a summary rationale as to why the groundwater is not hydrogeologically connected to the canal and indicated that additional hydrogeologic investigations of the former Coke Plant are planned. The workplan should specifically indicate that the SLERA will either provide a detailed quantitative evaluation of the groundwater pathway based on the additional investigations, or that the SLERA will be revisited if the hydrogeologic investigations are not completed prior to SLERA completion, and that the groundwater pathway will be thoroughly evaluated based on the investigations.*

Response

Section 2.1.1 of the work plan has been modified to indicate that the SLERA for aquatic receptors will be performed after the hydrogeological investigation of the former Coke Plant has been completed. The revised Section 2.1.2 is incorporated into the work plan.

Section 2.1.2, Aquatic Environment
Section 2.3, Selection of Assessment Endpoints and Measures of Affect, Assessment Endpoint 2

4. *Assessment Endpoint 2 (page 6) includes evaluation of potential risks to aquatic organisms exposed to groundwater discharge into adjacent waterbodies. Should the evaluation suggest a potential risk to aquatic organisms from exposure to sediment interstitial water, EPA may require that sediment be included as an exposure medium in the SLERA. The sediment data would be used to estimate exposures of benthic invertebrates and fish to contaminants in sediment, including exposures of higher trophic fish to bioaccumulative chemicals through a food chain evaluation. Procedures for evaluating risks to higher trophic level fish may consist of modeling fish tissue concentrations from sediment and possibly from lower trophic level organisms as prey sources, followed by comparison of these concentrations with tissue-based toxicity reference values(TRVs). For chemicals that are evaluated by the dietary route because of modulation of tissue levels by fish physiology, the comparison would be between concentrations of contaminants in dietary prey tissue and diet-based TRVs.*

Response

As indicated in the response to EPA Specific Comment 4 on the November 2008 Work Plan, " in a letter from US EPA dated April 27, 2004, surface water or sediment sampling beyond the property boundary was eliminated from consideration for sampling under the RCRA 3013 order. Since ISG and Tecumseh were not responsible for historical impacts potentially present in the Intake Flume and the Indiana Harbor Canal, the direct contact with sediment pathway is not a potential exposure pathway for consideration at this time. Therefore, evaluation of potential risks to benthic invertebrates due to direct contact with the sediment is not currently anticipated."

Assessment Endpoint 3 addresses the proposed evaluation to assess the potential for impacts to benthic receptors within the groundwater-surface water transition zone.

Section 3.2, Screening Level Exposure Assessment

5. *The method for evaluating food chain risks to the kingfisher should be described in more detail; specifically, the sources of bioconcentration and bioaccumulation factors and use of any food chain multipliers for determining fish and benthic invertebrate tissue concentrations for the belted kingfisher prey ingestion pathway should be discussed. In addition, if sediment is evaluated in the SLERA as an exposure medium for site-related chemicals, as mentioned in Specific Comment 4, the sources of biota-sediment accumulation factors (BSAFs) for modeling sediment chemicals into fish and benthic invertebrate prey items for higher trophic organisms should be identified.*

Response

As indicated in response to general comment 1, the specifics of the food chain model will be presented in the SLERA once the COPECs are selected. The sources of BCFs, BAFs, and FCMs will include USEPA sources preferentially over other literature sources. EPA may review and comment on these parameters when the SLERA is submitted.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

11/19/2009
Keith Nagel
Manager, Environmental Affairs
ArcelorMittal Indiana Harbor
4020 Kinross Lakes Parkway
Richfield, Ohio 44286-9000

Re: Arcelor Mittal Screening Level Ecologigal Risk Assessment (SLERA) Work
RCRA 3013 Monitoring, Testing, Analysis and Reporting

Dear Mr. Nagel:

We have completed our review of the September 2009 *Screening Level Ecological Risk Assessment (SLERA) Work Plan for the Former Coke Plant and Clark Landfill (Work Plan)* at the ArcelorMittal Indiana Harbor Facility in East Chicago, Indiana. The work plan is conditional approved contingent on ArcelorMittal addressing all suggestions and comments in the enclosure. ArcelorMittal need not revise the entire SLERA work plan. However, for the purpose of completeness, ArecelorMittal must submit revised pages of the work plan that address comments in the enclosure within 15 days of receipt of this letter and enclosure.

In general, EPA's comments on the December 2008 SLERA Work Plan were addressed as requested. Because information has been added to the September 2009 SLERA Work Plan that was not in the December 2008 version, which may affect potential ecological receptor exposures in the former Coke Plant and Clark Landfill, additional review comments are provided on evaluating exposure pathways for the terrestrial environment. In addition, comments are provided below to help clarify some of the revisions to the text that were made in response to EPA's comments on December 2008 version, particularly regarding the aquatic environment.

If you have any further questions or concerns please contact me at (312) 886-7954.

Sincerely,

Jonathan Adenuga
U.S. EPA Project Manager

Enclosure
bcc: Christine Liszewski

ENCLOSURE

GENERAL COMMENTS

1. EPA's General Comment 1 on the December 2008 version of the work plan requested clarification of the procedures for performing the SLERA, specifically in the selection of chemicals of potential ecological concern (COPECs) and the calculation of hazard quotients for the COPECs. The September 2009 revised work plan rearranged some text that partially helped clarify the respective procedures; however, the revised text is still somewhat confusing. Specifically, confusion arises in comparison of Section 2.4, where ecological screening levels are used to identify the COPECs for aquatic and terrestrial habitats, with Section 3.0 where the same screening levels and COPECs are used to calculate hazard quotients. In addition, Section 4.1 repeats the calculation method for determining a COPEC, again mentioning the screening levels. It would be helpful to clarify in these sections, including Section 4.1, that Section 2.4 first identifies COPECs through a screening process that compares maximum concentrations in environmental media with ecological screening levels, and that Section 3 then evaluates potential risks for those COPECs using the same ecological screening levels for lower trophic receptors, and then for higher trophic receptors through food chain modeling of the COPECs.

2. The September 2009 SLERA Work Plan does not include all parameters that will be needed to complete SLERA risk calculations (e.g., bioaccumulation factors and toxicity reference values are omitted). EPA will review and comment on all such parameters when the SLERA is submitted. Alternatively, if ArcelorMittal would prefer to obtain approval of all parameters prior to performing risk calculations, then the omitted parameters should be submitted in either a revised work plan or a technical memorandum.

SPECIFIC COMMENTS

Section 2.1.1, Terrestrial Environment

Section 2.2.1, Potential Exposure to Impacted Soil

1. The September 2009 work plan has been revised from the draft version of December 2008 to include a brief description of construction activities at the former Coke Plant property that appear to reduce or eliminate exposures to terrestrial organisms. The draft work plan identified the terrestrial habitat of the Coke Plant property as presenting a potentially complete exposure pathway to terrestrial organisms. Subsequent construction activities consisted of grading and cover of the Coke Plant property with clean granular fill, which was performed after submission and review of the draft version of the work plan. Because of these construction activities, it appears the former Coke Plant does not present a complete exposure route to terrestrial organisms. Nonetheless, the SLERA should include an evaluation of this potential exposure pathway, based on the planned site

visit and the recent construction activities, to clearly demonstrate its lack of completeness.

2. Similarly, the revised work plan describes the Clark Landfill as having been regraded and capped as part of the landfill closure, subsequent to submission of the draft work plan and its review by EPA. The unvegetated surface layer is described as a limestone aggregate that serves to prevent erosion, but also may eliminate exposures to any terrestrial habitat at the landfill. As with the former Coke Plant property, the SLERA should include an evaluation of potential exposure pathways to the terrestrial environment at the Clark Landfill in light of the recent activities to demonstrate lack of a complete exposure pathway.

Section 2.1.2, Aquatic Environment

3. EPA Specific Comment 2 on the December 2008 work plan requested that the work plan include an evaluation of the pathway of groundwater discharge at the former Coke Plant to the Indiana Harbor Canal, based on results of an EPA review of the November 2008 groundwater flow maps. The response to the comment provided a summary rationale as to why the groundwater is not hydrogeologically connected to the canal and indicated that additional hydrogeologic investigations of the former Coke Plant are planned. The work plan should specifically indicate that the SLERA will either provide a detailed quantitative evaluation of the groundwater pathway based on the additional investigations, or that the SLERA will be revisited if the hydrogeologic investigations are not completed prior to SLERA completion, and that the groundwater pathway will be thoroughly evaluated based on the investigations.

Section 2.1.2, Aquatic Environment

Section 2.3, Selection of Assessment Endpoints and Measures of Effect, Assessment Endpoint 2

4. Assessment Endpoint 2 (page 6) includes evaluation of potential risks to aquatic organisms exposed to groundwater discharge into adjacent water bodies. Should the evaluation suggest a potential risk to aquatic organisms from exposure to sediment interstitial water, EPA may require that sediment be included as an exposure medium in the SLERA. The sediment data would be used to estimate exposures of benthic invertebrates and fish to contaminants in sediment, including exposures of higher trophic fish to bioaccumulative chemicals through a food chain evaluation. Procedures for evaluating risks to higher trophic level fish may consist of modeling fish tissue concentrations from sediment and possibly from lower trophic level organisms as prey sources, followed by comparison of these concentrations with tissue-based toxicity reference values (TRVs). For chemicals that are evaluated by the dietary route because of modulation of tissue levels by fish physiology, the comparison would be between concentrations of contaminants in dietary prey tissue and diet-based TRVs.

Section 3.2, Screening Level Exposure Assessment

5. The method for evaluating food chain risks to the kingfisher should be described in more detail; specifically, the sources of bioconcentration and bioaccumulation factors and use of any food chain multipliers for determining fish and benthic invertebrate tissue concentrations for the belted kingfisher prey ingestion pathway should be discussed. In addition, if sediment is evaluated in the SLERA as an exposure medium for site-related chemicals, as mentioned in Specific Comment 4, the sources of biota-sediment accumulation factors (BSAFs) for modeling sediment chemicals into fish and benthic invertebrate prey items for higher trophic organisms should be identified.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

5/7/09
Keith Nagel
Manager, Environmental Affairs
ArcelorMittal Indiana Harbor
4020 Kinross Lakes Parkway
Richfield, Ohio 44286-9000

Re: Arcelor Mittal Screening Level Ecological Risk Assessment (SLERA) Workplan
RCRA 3013 Monitoring, Testing, Analysis and Reporting

Dear Mr. Nagel:

We have completed our review of the October 28, 2008 Screening Level Ecological Risk Assessment (SLERA) Workplan for the Arcelor Mittal Indiana Harbor Facility in East Chicago, Indiana. Several significant deficiencies were identified with the methodologies proposed in the SLERA Workplan. The revised workplan should be submitted within 45 days of receipt of this letter and Attachment.

If you have any further questions or concerns please contact me at (312) 886-7954.

Sincerely,

Jonathan Adenuga
U.S. EPA Project Manager

Enclosure
bcc: Christine Liszewski

ATTACHMENT

GENERAL COMMENTS

1. The proposed screening procedures, as described in the Screening Level Ecological Risk Assessment (SLERA) Work Plan, are somewhat unclear. Our understanding is that ArcelorMittal Indiana Harbor LLC (ArcelorMittal) plans to conduct a preliminary screening, comparing maximum detected concentrations to ecological screening values, to select chemicals of potential ecological concern (COPECs), as described in Section 2.4. Then, screening level hazard quotients for the selected COPECs will be calculated using the methodologies described in Section 3. ArcelorMittal should revise the SLERA Work Plan to clarify the proposed procedures. Refer also to Specific Comment 8 regarding the COPEC selection process.

2. Section 3 of the SLERA Work Plan proposes using upper confidence limits (UCLs) on the mean as the exposure point concentrations (EPCs) for evaluation of receptors such as plants and invertebrates. Section 3 also proposes using both UCLs and average (i.e., presumably the arithmetic mean) concentrations for evaluation of wildlife receptors. These proposed EPCs are not consistent with EPA Region 5 standard practice or with EPA guidance (US EPA 1997, as cited in the SLERA Work Plan), which recommends the use of maximum concentrations in SLERAs. It is recommended that maximum detected concentrations (and maximum detection limits of non-detects) be used as EPCs for terrestrial plants, invertebrates and aquatic life. The risk characterization section should then discuss the magnitude and the spatial extent of risks to provide the information that risk managers will need to evaluate the acceptability of the screening level risks. For the evaluation of avian and mammalian receptors, it is acceptable to use UCLs as the EPCs where sufficient data are available (as specified in the SLERA Work Plan), but arithmetic mean concentrations should not be used. The UCL is intended to be a conservative estimate of the mean concentration, and its calculation adjusts for the uncertainty associated with smaller sample sizes. When sample sizes are very large, the UCL approaches the mean. For this reason, EPA recommends the use of UCLs rather than arithmetic means as EPCs, even in baseline ecological risk assessments (BERAs). The SLERA Work Plan should be revised accordingly.

3. A number of concerns were noted with respect to the evaluation of benthic organisms, which may receive exposures to contaminated groundwater that are greater than the exposures that other aquatic life would be expected to receive. Refer to Specific Comments 4 through 7 for more detailed comments.

SPECIFIC COMMENTS

Section 2.1.1, Terrestrial Environment

1. This section indicates that access to the former Coke Plant by larger mammals is assumed to be prevented by perimeter fencing. It is noted that unless the fencing is unusually high and well maintained, fencing does not always exclude some larger mammals such as the white-tailed deer. Nonetheless, at smaller sites, larger mammals typically have lower exposures to contaminants than small mammals like shrews, and no changes to the selected receptors appear to be needed based on this comment. For clarification, the SLERA Work Plan should be revised to indicate what proportion of the 50-acre former Coke Plant provides terrestrial habitat. Additionally, the uncertainty section of the SLERA should include discussion regarding the possibility of access to the former Coke Plant by larger mammals, and the uncertainty resulting from excluding these receptors from the risk evaluation.

Section 2.1.2, Aquatic Environment

2. Section 2.1.2 discusses the impact of the sheet pile wall at the former Coke Plant on groundwater discharge to the Indiana Harbor Canal. It explains that the 25 feet of the upper sheet pile was removed, but that "in this location the deeper sheet pile wall is present and still serves to eliminate discharge of deep groundwater to the canal." However, based on a review of groundwater flow maps presented in Volume 3 of the Hydrogeologic Conditions Report dated November 2008, deep groundwater in this area does discharge to the canal. Figures 6.3 and 6.5 of the above-referenced report indicate that deep groundwater along the former Coke Plant/ canal boundary, although slightly deflected to the south, discharges to the canal. The SLERA should be revised to acknowledge this complete exposure pathway.

Section 2.2.2, Potential Exposure to Groundwater and Surface Water

3. Section 2.2.2 states that "steel sheet pile walls line the shoreline in portions of the facility, including at the former Coke Plant, and limit groundwater discharge into the surrounding waterbodies," but that "limited groundwater discharge may occur in areas where the sheet pile walls are not present (i.e., shallow groundwater associated with the southeast corner of the former Coke Plant)." However, the description of "limited" quantities is subjective and vague. The SLERA Work Plan should be revised to quantify the discharge using Darcy's Law and estimates of hydraulic conductivity, hydraulic gradient, and cross sectional area to support the assertion of low discharge rate; alternatively, references to "limited" discharge should be removed.

Section 2.2.3, Pathways to be Evaluated

4. The list of potential exposure pathways has omitted one important pathway: direct contact with sediments and interstitial waters in the Intake Flume and the Indiana Harbor Canal (IHC) by benthic invertebrates and other transition zone organisms. It is understood that further refinement of the problem formulation will occur as discussed in Section 2.2.2. However, it is noted that if there is potential for discharge of contaminants in groundwater to the bottom sediments of the Intake Flume and/or the IHC, then this potential exposure pathway should be evaluated in the SLERA.

Section 2.3, Selection of Assessment Endpoints and Measures of Effect

5. As discussed in Specific Comment 4, the SLERA may need to evaluate potential exposure of benthic invertebrates to Intake Flume and/or IHC sediments and interstitial waters. Associated assessment endpoints and measures of effect should be added, if necessary.

6. Under *Measure of Effect 2,* the SLERA Work Plan indicates that in the absence of surface water data, either a site-specific or a default dilution attenuation factor (DAF) will be applied to groundwater data to estimate surface water concentrations. While this procedure is acceptable for estimating exposure to water column-dwelling aquatic life, it may not be adequately protective of benthic invertebrates and other transition zone organisms that live closer to points of groundwater discharge. These organisms may be exposed to less diluted groundwater concentrations. For this scenario, exposure should be based on estimated concentrations in the transition zone water. In the absence of any site-specific data on attenuation or dilution of groundwater contaminants in the transition zone, an assumed DAF of 1 should be used to estimate transition zone water concentrations. Surface water screening values should then be applied to the transition zone water concentrations to estimate risks to transition zone organisms. Depending on the resolution of Specific Comment 4, the SLERA Work Plan may need to be revised to include these alternative procedures.

7. Similarly, under *Measure of Effect 4*, the SLERA Work Plan indicates that a DAF of 10 may be applied to groundwater data in order to estimate surface water concentrations in the context of estimating exposures to wildlife. Presumably, bioaccumulation factors would then be used with the estimated surface water concentrations to calculate estimated prey tissue concentrations. As discussed in Specific Comment 6, it is not clear that these procedures will accurately estimate exposures to benthic-dwelling organisms, and an assumed DAF of 1 may need to be used to estimate transition zone water concentrations. These transition zone water concentrations should then be used to estimate uptake to benthic organisms. Depending on the resolution of Specific Comment 4, the SLERA Work Plan may need to be revised to include these alternative procedures.

Section 2.4, Selection of COPECs

8. This section indicates that chemicals will be eliminated from further evaluation as COPECs if they are essential nutrients, if they have a frequency of detection of less than 5 percent, or if they are not detected. As specified by EPA guidance (US EPA 2001, as cited in the SLERA Work Plan), refining the COPEC list based on essential nutrients or frequency of detection should be reserved for the BERA, and should not occur during the SLERA. Additionally, the SLERA should eliminate only those non-detected chemicals with detection limits that are less than ecological screening values (US EPA 1997, as cited in the SLERA Work Plan). Non-detected chemicals with detection limits that exceed their screening values should be retained and identified as non-detects. The list of COPECs for screening-level risk calculation should not be refined to omit essential nutrients, chemicals with low frequency of detection, or non-detected chemicals with detection limits that exceed screening values. However, it is noted that considerations such as frequency of detection can be discussed in the context of the scientific-management decision regarding the need to continue the evaluation of a COPEC in a BERA. The SLERA Work Plan should be revised accordingly.

Section 3.1, Data to be Considered in the SLERA

9. In addition to the summary statistics listed in this section, the SLERA should also present the range of detection limits for each analyte. See also Specific Comment 8 regarding the evaluation of detection limits in the COPEC selection process.

Section 3.2, Screening Level Exposure Assessment

10. This section indicates that only COPECs that are identified as bioaccumulative chemicals of concern by the Great Lakes Water Quality Initiative will be evaluated in food chain models. This approach may result in the underestimation of risk and is not standard practice in EPA Region 5. EPA instead recommends evaluating food chain risks to wildlife for all constituents with exceedences of the EPA Region 5 Ecological Screening Levels (ESLs) (US EPA 2003, as cited in the SLERA Work Plan). In some cases, EPA Region 5 has allowed constituents evaluated for food chain risks to be limited to those chemicals identified as "Important Bioaccumulative Compounds" in EPA's *Bioaccumulation Testing and Interpretation for the Purpose of Sediment Quality Assessment: Status and Needs* (EPA-823-R-00-01, February 2000). ArcelorMittal may consider adopting this approach. The SLERA Work Plan should be revised accordingly.

11. This section indicates that the deer mouse was selected as the omnivorous mammalian receptor to be evaluated in the SLERA. Shrews have greater food ingestion rates than the deer mouse, and shrews consume a greater proportion of animal prey, which typically have greater tissue concentrations of contaminants than plants have. Shrews also tend to have greater incidental ingestion of soil than deer mice. For these reasons, exposure to shrews is expected to be greater than exposure to deer mice, and the short-tailed or

masked shrew is recommended as the receptor used to represent the omnivorous mammal guild. The SLERA Work Plan should be revised to select a shrew rather than the deer mouse as the omnivorous mammalian receptor.

12. The only wildlife receptor selected for evaluation of food chain risks via the aquatic exposure pathway is the belted kingfisher. It is unclear whether the evaluation of this receptor alone will be adequate. In many cases, calculated exposures to waterfowl or shorebirds that consume a diet composed largely of benthic invertebrates (and that incidentally ingest a considerable amount of sediments) are greater than exposures to piscivorous birds such as the kingfisher. The SLERA Work Plan should be revised to discuss whether any such receptors are likely to forage at the areas of the IHC and Intake Flume that are potentially affected by site-related contamination. If so, an appropriate representative receptor should be selected.

13. Section 3.2 includes an exposure duration (ED) term in the total daily dose equation and indicates that this term represents the percent of the year that the receptor forages in the investigation area. In general, it is not appropriate to include an ED term (also sometimes referred to as a "migration factor") because selected receptors are normally year-round residents or spend the breeding season in the investigation area. Since the Work Plan specifies that an ED of 1 will be used for all receptors, no revisions to the SLERA Work Plan are needed. The purpose of this comment is to note that EDs are not generally acceptable in either a SLERA or a BERA, in case ArcelorMittal further evaluates any areas in a BERA.

Section 3.3, Screening Level Effects Assessment

14. This section notes that EPA's Ecological Soil Screening Levels (Eco-SSLs) for plants and invertebrates will be used (i.e., Eco-SSLs for birds and mammals will be excluded). This is acceptable for the purposes of calculating screening-level hazard quotients for terrestrial plants and invertebrates. However, it is not acceptable for the purposes of a preliminary screening step in which COPECs are selected for evaluation of food chain risks to wildlife. Based on the text in Section 2.4, it is understood that ArcelorMittal does intend to conduct this type of preliminary screening step. For this preliminary screening, the lowest of all Eco-SSL values, including those for birds and mammals, should be used. The SLERA Work Plan should be revised accordingly.

15. It is recommended that ArcelorMittal reverse the order of preference for sources of surface water screening values. The suggested order of preference is: (1) EPA Region 5 ESLs; (2) Indiana water quality standards (WQS); and (3) federal chronic ambient water quality criteria (AWQC). Indiana WQS are considered preferable to federal AWQC because, in some cases, they have been developed more specifically for Indiana waters.

16. This section indicates that a default hardness of 100 milligrams per liter (mg/L) $CaCO_3$ will be used if site-specific data are unavailable. Consistent with methodologies used in

the EPA Region 5 ESLs, a default hardness of 50 mg/L $CaCO_3$ should instead be used if site-specific data are unavailable. Also, note that any site-specific data used should be data for the receiving water body, not for groundwater.

17. With respect to selecting toxicity reference values for use in evaluating dietary doses of COPECs to birds and mammals, it is noted that no-observed-adverse-effect-levels (NOAELs) should be used in the SLERA. It is also noted that growth, reproduction, and mortality endpoints should all be considered, though normally reproductive endpoints are ultimately used because they are typically the most sensitive endpoints.

Table 1, Exposure Parameters for Wildlife Receptors

18. Based on Table 1, it is unclear whether ArcelorMittal intends to assume a diet of 50 percent plants and 50 percent invertebrates for the American robin (as indicated in the table), or a diet of 100 percent of the most contaminated food item (as indicated in the footnotes to the table) in the SLERA. Clarification should be provided. The latter of the two approaches is acceptable. It is noted that, because invertebrates typically carry higher body burdens of most contaminants than plants, a dietary assumption of 50 percent plants and 50 percent invertebrates may not be adequately protective of the robin and other omnivorous birds. Many omnivorous bird species feed more heavily or even exclusively on invertebrates during the spring breeding season. This dietary shift to a potentially more contaminated diet coincides with birds' reproductive life stage, which is the most toxicologically sensitive stage. ArcelorMittal should ensure that SLERA risk calculations do not underestimate risks to these birds.

19. Estimated food ingestion rates from Nagy (1987, as cited in the SLERA Work Plan) have been used in Table 1. EPA's Eco-SSL guidance documents, specifically Attachment 4-1, *Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs* (April 2007, available from http://www.epa.gov/ecotox/ecossl/SOPs.htm), is the preferred source of ingestion rates. When possible, for receptors lacking food ingestion rates in the Eco-SSL documents (e.g., belted kingfisher), it is recommended that the Eco-SSL approach for estimating food ingestion rates (i.e., using high-end estimates) be applied to available data in the Wildlife Exposure Factors Handbook (US EPA 1993b, as cited in the SLERA Work Plan). Table 1 should be revised accordingly.

AECOM

Submitted to:
ArcelorMittal Indiana Harbor LLC
East Chicago, IN

Submitted by:
AECOM
Milwaukee, WI
60139026

Screening Level Ecological Risk Assessment Work Plan for the Former Coke Plant

RCRA Docket No R3013-5-03-002
Site EPA ID No. IND 005 462 601

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Site EPA ID No. IND 005 462 601

Prepared By: Christine Archer

Reviewed By: Kristen Durocher

CERTIFICATION

I certify that the information contained in or accompanying this submission is true, accurate, and complete [to the best of our knowledge].

Keith Nagel
Director, Environmental Affairs and Real Estate
Tecumseh Redevelopment, Inc.

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1.0 Introduction

ArcelorMittal Indiana Harbor, LLC (ArcelorMittal-IH; formerly ISG-Indiana Harbor, Inc.) is an operating steel mill producing a variety of flat-rolled steel products. The steel mill complex is located at 3001 Dickey Road in East Chicago, Indiana (Figure 1). The location can be further described as in Township 37 North, Range 9 West, Sections 9, 10, 15, and 16. Tecumseh Redevelopment, Inc. (Tecumseh) is the owner of land immediately adjacent to ArcelorMittal-IH that was formerly part of the steel mill complex. The Tecumseh properties were formerly occupied by related steel manufacturing businesses but are now designated for sale and redevelopment as industrial sites.

On October 23, 2003, the United States Environmental Protection Agency (US EPA) Region 5 issued a RCRA Section 3013 Administrative Order (US EPA Docket No. R 3013-5-03-002) to ArcelorMittal-IH (as ISH-Indiana Harbor, Inc.) and Tecumseh. The Order required that both parties prepare a proposal for monitoring, testing, analysis, and reporting to ascertain the nature and extent of hazards posed by hazardous wastes that are present or may have been released at 14 identified Units and one Area of Concern (AOC) at the facility. The former Coke Plant included one of the units and the AOC.

As part of these activities, a screening level ecological risk assessment (SLERA) is being conducted for the former Coke Plant (Figure 2). Previous site characterization efforts indicated that this parcel and the Clark Landfill may contain ecological habitat (STS, 2006) and US EPA Region 5 has requested that a SLERA be conducted. The remaining Units lack terrestrial habitat and do not warrant ecological evaluation. The former Coke Plant property is owned by Tecumseh and was recently graded and the clean granular fill was placed to provide a level and stable surface for the staging of construction equipment and supplies in support of an adjacent industrial redevelopment project.

This document contains the Work Plan for the SLERA of the former Coke Plant. The work plan for the Clark Landfill is presented separately. The objective of the SLERA at the former Coke Plant is to evaluate whether or not populations of ecological receptors are potentially at risk due to exposure to site-related chemical stressors.

1.1 Facility Description

The ArcelorMittal-IH and adjacent Tecumseh properties consist of approximately 1,200 acres of land along the southern shore of Lake Michigan and the Indiana Harbor Canal. The operations have been producing steel since the 1920s, with the earliest operations occupying the mainland areas of the property. The majority of the steel mill complex (more than 80%) is located on a peninsula extending northward into Lake Michigan (the Peninsula) which was made from the controlled filling of the lake with iron and steel-making slag. Less than 20% of the steel making complex is located on the Indiana mainland.

The steel making complex originally opened in the early 1920s as the Mark Steel Company. It was later operated by Youngstown Sheet and Tube Company (Youngstown, Pennsylvania), Jones and Laughlin Steel Corporation (Pittsburg, Pennsylvania), and LTV Steel (Cleveland, Ohio). In April of 2002 International Steel Group, Inc. was formed and acquired the majority of the former LTV Indiana Harbor Works facility. The remaining portions of the former LTV Indiana Harbor Works facility were acquired by Tecumseh. Subsequently the ISG-IH and Tecumseh properties were acquired by Mittal Steel USA, which then merged with Arcelor. The former ISG-Indiana Harbor, Inc. is now referred to as ArcelorMittal Indiana Harbor LLC.

The former Coke Plant is located inland from the peninsula, along the Indiana Harbor Canal just south of the main east-west railroad corridor. The former Coke Plant encompasses approximately 50 acres of land which was developed in the early 1920's with two coke ovens and an ancillary byproduct recovery system. Later, in the 1960's two additional coke ovens were constructed and one of the original two coke ovens was razed. The Coke Plant operations ceased in April 1982 and the aboveground portions of the former Coke Plant buildings and structures were demolished in the early 1990s. The coal bin on the west side of the former coke facility was filled with slag to produce a level surface. Process sewers and underground piping were also capped and/or decommissioned as part of the demolition process. Investigational activities are on-going at the former Coke Plant. In addition, the property has been leased for industrial re-use. The property has undergone placement of granular fill to provide a level and stable surface for the staging of construction equipment and supplies in support of an adjacent industrial redevelopment project.

1.2 Screening Level Ecological Risk Assessment Guidance and Methodology

The SLERA for the former Coke Plant will be conducted following a tiered approach and methodology. Conducting assessments in a tiered, step-wise manner allows the risk assessor and risk manager to maximize the use of available information and sampling data, while providing the opportunity to reduce the uncertainties inherent in the ecological risk assessment process through the use of focused supplemental data collection to fill key data gaps identified in the previous tier of the assessment, as necessary. As requested by US EPA Region 5, the SLERA will be conducted in accordance with the following documents:

- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessment, Interim Final (US EPA, 1997); and
- The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments (US EPA, 2001).
- Attachment 4-1 Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs) Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs (OSWER Directive 9285.7-55, April 2007)

US EPA's Guidelines for Ecological Risk Assessment (US EPA, 1998) also provide relevant guidance on the SLERA approach. The SLERA serves as Steps 1 and 2 of US EPA's eight-step process for ecological risk assessment (Figure 3) approach for Superfund sites. As requested by US EPA Region 5, this approach is being applied to the SLERA conducted as part of RCRA investigations at this Site.

In accordance with current US EPA guidance, the SLERA will consist of a preliminary ecological risk evaluation based largely on readily available site information and sampling data. In the SLERA, a preliminary conceptual site model (CSM) will be developed for the Site, available data will be screened against ecotoxicological benchmarks, and data gaps will be identified.

In accordance with the EPA guidance and process documents, the principal components of the planned SLERA will include:

- Problem Formulation: In this phase, the objectives of the ERA are defined, and a plan for characterizing and analyzing risks is determined. Available information regarding stressors and specific sites is integrated. Products generated through problem formulation include assessment endpoints and CSMs.

- Risk Analysis: During the risk analysis phase of work, data are evaluated to characterize potential ecological exposures and effects.

- Risk Characterization: During risk characterization, exposure and stressor response profiles are integrated through risk estimation. Risk characterization also includes a summary of uncertainties, strengths, and weaknesses associated with the risk assessment.

These three components are conceptually sequential and are described in more detail in the following sections. However, the risk assessment process is frequently iterative, and new information brought forth during the risk characterization phase, for instance, may lead to a review of the problem formulation phase, or may require additional data collection and analysis. The US EPA's Ecological Risk Assessment Guidance for Superfund (US EPA, 1997) and the US EPA Region 5 Superfund website expand the primary components listed above and present an eight-step process for assessments specific to Superfund sites. The basic elements of the eight-step Superfund process, as well as the accompanying scientific/management decision points (SMDPs) are consistent with the three-step framework. SMDPs require meetings between the risk assessors and risk managers at several points during the process to evaluate, re-direct, and ultimately approve the risk assessment.

2.0 Screening Level Problem Formulation

In the problem formulation phase of a SLERA, the study site is characterized by examining the habitat and ecological species present, and evaluating the presence of site-related constituents to identify chemicals of potential ecological concern (COPECs). The information collected during problem formulation is used to develop a preliminary CSM and identify potential exposure pathways to be investigated in the SLERA.

2.1 Environmental Setting

As indicated in Figure 1, the facility is located adjacent to the Indiana Harbor Canal. A site visit will be conducted as part of the SLERA in order to characterize the current environmental setting of the former Coke Plant. The available information presented below has been presented in previous reports (STS, 2006; STS, 2008) and will be confirmed and augmented following the site visit.

2.1.1 Terrestrial Environment

The location of the former Coke Plant is inland from the Peninsula, along the Indiana Harbor Canal just south of the main east-west railroad corridor (Figure 2). The former Coke Plant covers approximately 50 acres and is bounded by the main east-west railroad right-of-way corridor to the northeast, the Indiana Harbor Canal to the southeast, a leased parcel of land to the southwest and the Riley Road entrance to the Peninsula to the northwest. Operations at the Coke Plant ceased in 1982 and the aboveground portions of the former coke plant buildings and structures were demolished in the early 1990s. The former Coke Plant is currently leased property being reused to support nearby redevelopment.

Wildlife access to the former Coke Plant is limited by perimeter fencing and by the Indiana Harbor Canal. A limited number of cotton wood trees are present along the sheet pile wall adjacent to the Indiana Harbor Canal. Robins have been observed in the area in the past, but the current industrial use of the facility severely limits habitat potential. The former Coke Plant property is currently being used to support nearby industrial redevelopment construction. The land surface of the former Coke Plant has recently been covered with clean granular fill and graded level. The depth of granular fill ranges from two to six feet. The fill has been added and compacted to support the weight of construction materials and heavy equipment that are stored on the former Coke Plant. A geotextile was placed as a "warning barrier" between the original land surface and the new granular fill. Photographs of the site and its current use are provided in Appendix A.

Although terrestrial species present within the former Coke Plant may have previously included plants, soil invertebrates (e.g., earthworms), small birds (e.g., robins), and small mammals not excluded by the perimeter fencing (e.g., mice), the recent improvements to the former Coke Plant property and the on-going industrial use of the area severely limits the habitat potential. The former potentially impacted surface soil is no longer exposed due to the installation of the geotextile fabric and the placement of two to six feet of compacted granular fill; and, as such, the direct contact pathway for terrestrial and avian receptors is now incomplete. Daily active use of the site by humans, the truck traffic, the operation of heavy equipment, and the lack of vegetation further reduces the habitat quality and is expected to eliminate terrestrial exposure pathways. Therefore, terrestrial and avian receptors are not expected to be found at the former Coke Plant. This information will be confirmed during the site visit and documented in the SLERA.

2.1.2 Aquatic Environment

The most significant surface water features in the vicinity of the facility are Lake Michigan, the Indiana Harbor, and the Indiana Harbor Canal. The former Coke Plant is located adjacent to the Indiana Harbor Canal. The Indiana Harbor Canal, located adjacent to the former Coke Plant, is classified as a Federal navigation channel and has undergone extensive modification including ditching, channelization, flow modification, and lining with metal sheet pile. The canal is included within the Grand Calumet River Area of Concern which was identified based on legacy pollutants found in the sediments at the bottom of the Grand Calumet River, Indiana Harbor and the Canal.

The Indiana Harbor Canal primarily flows north before discharging into the Indiana Harbor, and subsequently into Lake Michigan. The canal was built in the 1880s and has served as a shipping channel in one of the most industrialized areas of the United States for over a century. The flow into the Indiana Harbor Canal comes from the Lake George Canal and the Grand Calumet River and much of this flow results from industrial and municipal discharges. According to Crawford and Wangsness (1987), these discharges accounted for 90% of the flow observed at the confluence of the east branch of the Grand Calumet River and the Indiana Harbor Canal, and almost all of the flow in the west branch of the Grand Calumet River. Contributions from surface water runoff within the watershed to the canal are small.

Surface water flow at the former Coke Plant is minimal and controlled on the west side by storm water sewers present in the adjacent parking lot. The surface material at the former Coke Plant has little relief and almost entirely consists of highly permeable granular slag fill. Therefore, precipitation rapidly infiltrates into the slag fill with little surface flow.

Although the flow in the Indiana Harbor Canal is typically toward Lake Michigan, if water levels in Lake Michigan rise (seiche) relative to those in the canal, short term backwater effects and flow reversals can occur. With no other outlets, normal flow accumulates within the canal until equilibrium between the lake and canal levels is re-established. Flow reversals are short in duration, whereas backwater (gradient) effects on water levels can persist for slightly longer periods of time.

Steel sheet pile walls form a continuous boundary along the former Coke Plant adjacent to the Indiana Harbor Canal, except for at one small area adjacent to the southeastern corner of the former Coke Plant where the upper 25 feet of sheet pile has been removed due to failure. However, in this location the deeper sheet pile wall is present and still serves to eliminate discharge of deep groundwater to the canal. Sheet pile walls also line much of the eastern facility boundary along the water. In general, the sheet pile walls retard direct interaction between the groundwater on the site and the Indiana Harbor and Indiana Harbor Canal. The deep groundwater system at the former Coke Plant appears to be essentially stagnant with little discharge to the canal. Additional hydrogeologic investigation of the former Coke Plant is underway and the SLERA of aquatic receptors will be performed after the former Coke Plant hydrogeological investigations are complete.

Species potentially present within the Indiana Harbor Canal likely include benthic and aquatic invertebrates, fish, and birds. During an evaluation of the fish community within the Grand Calumet River Area of Concern conducted between 1985 and 1988, a total of 21 fish species were collected with the largest number occurring within the Indiana Harbor Canal (14 species; Simon, et al., 1988).

Specific species identified by the U.S. Fish and Wildlife Service (USFWS, 1996) as potentially present within the Indiana Harbor Canal and Lake Michigan include: coho salmon (*Oncorhynchus kisutch*), chinook salmon (*O. tschauytscha*), pink salmon (*O. gorbusch.a*), rainbow trout (*Salmo gairdneri*), rainbow smelt (*Osmerus mordax*), lake trout (*Salvelinus namaycush*), yellow perch (*Perca flavescens*), brown trout (*Salmo trutta*), carp (*Cyprinus carpio*), and catfish (*Ictalurus sp.*), peregrine falcon (*Falco peregrinus*), wood duck (*Aix sponsa*), mallard (*Anas platyrhynchos*), double-crested cormorant (*Phalacrocorax autitus*),

black-crowned night-heron (*Nycticorax nycticorax*), great blue heron (*Ardea herodias*), green-backed heron (*Butorides striatus*), tree swallow (*Tachycineta bicolor*), barn swallow (*Hurundo rustica*), common merganser (*Mergus merganser*), herring gull (*Larus argentatus*), red-winged blackbird (*Agelaius phoeniceus*), and great egret *(Casmerodius albus).* These receptors have not necessarily been identified within the Indiana Harbor Canal in the vicinity of the former Coke Plant.

2.2 Identification of Ecological Receptors and Potentially Complete Exposure Pathways

Ecological receptors are the components of ecosystems (i.e., species or sensitive habitats) that are or may be adversely affected by a chemical, physical, or biological stressor. Receptors can be any part of an ecological system, including species, populations, communities, and the ecosystem itself. The SLERA will focus on the pathways for which (1) constituent exposures are the highest and most likely to occur, and (2) there are adequate data pertaining to the receptors, exposure pathways, and toxicity for completion of risk analyses.

US EPA (1997, 1998) defines a complete exposure pathway as "one in which the chemical can be traced or expected to travel from the source to a receptor that can be affected by the chemicals." Therefore, in order for a complete exposure pathway to exist, a chemical, a migration pathway, a receptor, and mechanisms of toxicity of that chemical must be demonstrated. The selected exposure pathways are discussed below.

Areas which lack ecological habitat will not be evaluated in the SLERA due to incomplete exposure pathways. This approach is used to focus the risk evaluation on exposure pathways that are considered to potentially complete and for which there are adequate data pertaining to the receptors, exposure, and toxicity for completion of the risk analysis.

2.2.1 Potential Exposure to Impacted Soil

As a result of recent changes to the former Coke Plant, potential exposure pathways for terrestrial and avian receptors to impacted soils are no longer expected to be complete. The presence of a geotextile fabric, with two to six feet of clean, compacted granular slag-fill over the area has eliminated the potential for terrestrial receptors to come in contact with the surface soils that may have been impacted during the operational period of the former Coke Plant. Therefore, potential impacts to terrestrial receptors at the former Coke Plant are unlikely and it is anticipated that this exposure pathway will not be evaluated in the SLERA for the former Coke Plant. The site visit will evaluate the presence or absence of this pathway and the SLERA will document this determination.

The uncertainty section of the SLERA will include a discussion of the potential for larger mammals to access the former Coke Plant property, but it is unlikely that larger mammals will be present because of the lack of forage area and the industrial use of the property. Thus, a significant under-estimation of potential risks is unlikely to occur.

2.2.2 Potential Exposure to Groundwater and Surface Water

Ecological receptors are not directly exposed to groundwater; however, exposure to constituents in groundwater may occur when groundwater enters a waterbody. In accordance with recent US EPA guidance (2008), the potential for risks to occur at the groundwater-surface water transition zone will be assessed. The following five step framework will be followed to incorporate this transition zone into the SLERA and help to refine the CSM:

1. Review available site-related chemistry data to identify known or potential impacts due to site-related constituents.

2. Identify the hydrogeological regime and potential fate and transport mechanisms for constituents in groundwater, including (a) identification of areas of groundwater discharge and (b) spatial and temporal variability in the magnitude and location of groundwater discharge.

3. Identify ecological resources in areas of groundwater discharge, including associated transition zones.

4. Identify ecological endpoints and surrogate receptors.

5. Develop a CSM and associated risk hypotheses and questions.

Steel sheet pile walls line the shoreline in portions of the facility, including at the former Coke Plant, and limit groundwater discharge into the surrounding waterbodies. However, limited groundwater discharge may occur in areas where the sheet pile walls are not present (i.e., shallow groundwater associated with the southeast corner of the former Coke Plant). Therefore, invertebrates and fish that may be present within the Indiana Harbor Canal have the potential to be exposed to constituents discharged from the groundwater into the surface water through direct contact. Birds that feed on these aquatic organisms may be exposed to site-related constituents due to ingestion of prey items that may have accumulated constituents in their tissue.

Additional hydrogeologic investigation of the former Coke Plant is underway and the SLERA of aquatic receptors will be conducted when the investigation is complete.

Since surface water runoff to Lake Michigan, Indiana Harbor Canal and Indiana Harbor does not occur (most runoff is recycled or infiltrates into the ground), the overland flow transport mechanism is not complete to move constituents to the water bodies that bound the properties. Therefore, this pathway will not be evaluated in the risk assessment.

2.2.3 Pathways to be Evaluated

- Potential exposure pathways that may be present at the former Coke Plant include the following: Direct contact with surface water in the Indiana Harbor Canal by fish and aquatic invertebrates;

- Direct contact with groundwater discharging into the Indiana Harbor Canal by benthic invertebrates; and

- Uptake of bioaccumulative compounds into birds through food chain exposure pathways associated with the Indiana Harbor Canal.

If the site visit identifies potentially complete avian or terrestrial exposure pathways at the former Coke Plant, then the following may also be present:

- Direct contact with surface soil at the former Coke Plant by plants and soil invertebrates; and

- Uptake of bioaccumulative compounds into birds and small mammals through food chain exposure pathways associated with the former Coke Plant.

2.2.4 Threatened/Endangered Species and Habitats

The potential presence of threatened/endangered species or habitat in the vicinity of the Site will be assessed. Requests have been made to the USFWS and the Indiana Department of Natural Resources regarding information on federal and state-listed endangered, threatened, or rare species, or critical

habitats in the vicinity of the facility. Copies of the responses and a discussion of the findings will be provided in the SLERA.

2.3 Selection of Assessment Endpoints and Measures of Effect

According to the US EPA (1998), assessment endpoints are formal expressions of the actual environmental value to be protected. They usually describe potential adverse effects to long-term persistence, abundance, or reproduction of populations of key species or key habitats. Since direct measurement of assessment endpoints is often not feasible, surrogate endpoints (called measures of effect) are used to provide the information necessary to evaluate whether the values associated with the assessment endpoint are being protected.

A measure of effect is a measurable ecological characteristic and/or response to a stressor (US EPA, 1998). Typically, measures of effect have clearly defined numeric criteria. The measure of effects should provide a "general indication of the potential for ecological risk or lack thereof" (US EPA, 2001). In the SLERA, measures of effect are highly conservative, often comparing worst-case scenarios to conservative ecological benchmarks with no consideration for bioavailability or viability of habitat.

The preliminary assessment endpoints and measures of effect for the SLERA are presented below. These may be refined in the SLERA based on the results of the site visit and identification of available habitat and potentially complete exposure pathways. The terrestrial and avian evaluations will only be conducted if the site visit identifies potentially complete terrestrial exposure pathways at the former Coke Plant.

Assessment Endpoint 1 - Maintenance of terrestrial invertebrate and plant communities at the former Coke Plant that are representative of communities in similar industrial areas of Indiana.

> *Measure of Effect 1* - Comparison of analytical chemistry results from surface soil samples to ecological soil screening values derived for the protection of plants and soil dwelling invertebrates. Concentrations in excess of ecological soil screening values will be considered indicative of a potential for ecological risks.

Assessment Endpoint 2 - Maintenance of aquatic invertebrate and fish communities within the Indiana Harbor Canal that are representative of communities in similar industrial areas of Indiana.

> *Measure of Effect 2* - Comparison of analytical chemistry results from surface water samples to surface water screening values derived for the protection of aquatic life. In the absence of surface water data, a dilution attenuation factor (DAF) will be applied to the groundwater analytical chemistry results to serve as a surrogate for surface water concentrations. In the absence of a site-specific DAF, a 1:10 dilution of groundwater into surface water will be assumed as a default. Concentrations in excess of surface water screening values will be considered indicative of a potential for ecological risks.

Assessment Endpoint 3 - Maintenance of benthic invertebrate communities present within the groundwater-surface water transition zone of the Indiana Harbor Canal that are representative of communities in similar industrial areas of Indiana.

> *Measure of Effect 3* - Comparison of analytical chemistry results from groundwater samples to surface water screening values derived for the protection of aquatic life. Comparison of these concentrations to aquatic life screening values is assumed to be adequately protective of transition

zone receptors (EPA, 2008). Concentrations in excess of surface water screening values will be considered indicative of a potential for ecological risks.

Assessment Endpoint 4- Maintenance of terrestrial vertebrate wildlife communities at the former Coke Plant that are representative of communities in similar industrial areas of Indiana.

Measure of Effect 4 - Comparison of calculated total daily dose for vertebrate wildlife receptors from ingestion of contaminated prey items to constituent-specific toxicity reference value.

Assessment Endpoint 5 - Maintenance of vertebrate wildlife communities feeding on aquatic organisms found within the Indiana Harbor Canal that are representative of communities in similar areas of Indiana.

Measure of Effect 5- Comparison of calculated total daily dose for vertebrate wildlife receptors from exposure to surface water and ingestion of contaminated prey items to constituent-specific toxicity reference value. In the absence of surface water data, a DAF will be applied to the groundwater analytical chemistry results to serve as a surrogate for surface water concentrations. Bioaccumulation factors will be applied to the estimated surface water concentrations to estimate prey tissue concentrations,

2.4 Selection of COPECs

COPECs are a subset of the complete list of constituents detected in media in the area under investigation that are carried through the quantitative ecological risk assessment process. COPECs represent the constituents detected in the environmental media that could present a potential risk for ecological receptors. As part of the identification of COPECs, essential nutrients (i.e., calcium, magnesium, sodium, and potassium) will be identified and retained if screening values are not identified or if the detected concentrations are above screening values.

Selection of COPECs will be based on a comparison of constituent concentrations in surface soil (if warranted) and surface water (i.e., groundwater with DAF applied) against media specific screening values. Constituents with maximum exposure point concentrations less than their respective constituent-specific risk-based screening value will not be retained as COPECs; constituents with maximum exposure point concentrations in excess of the screening values will be retained as COPECs. If no screening value is available, the constituent will be selected as a COPEC.

Non-detected constituents will also be compared to the appropriate screening values. Constituents with detection limits above the screening values will be identified as non-detects and retained for evaluation and discussion. However, retaining constituents that have detection limits greater than risk-based screening values will only be considered for samples that are not diluted because of higher concentrations of detected analytes.

The terrestrial and avian evaluations will only be conducted if the site visit identifies potentially complete terrestrial exposure pathways at the former Coke Plant. Sources of ecological screening values are presented below.

When available, soil screening values will be selected for impacts to both plants and terrestrial invertebrates. Sources for soil screening values will be considered in this order:

- US EPA Eco-SSLs for plants and invertebrates developed according to US EPA guidance (US EPA, 2005; available at http://www.epa.gov/ecotox/ecossl/);

- US EPA Region 5 Ecological Screening Levels (ESLs) for soil (US EPA, 2003);

- Alternative terrestrial plant and invertebrate screening values will be selected when ESLs and Eco-SSLs are unavailable. These include screening values developed by the Oak Ridge National Laboratory (ORNL; Efroymson et al., 1997a; 1997b) and the Dutch Ecotoxicological Intervention Values (EIV) obtained from the Netherlands National Institute of Public Health and Environmental Protection (Van den Berg et al., 1993).

Sources for surface water screening values will be considered in this order:

- US EPA Region 5 ESLs for water (US EPA, 2003);

- Indiana water quality standards (WQS) for the protection of aquatic life (Indiana Administrative Code, Title 327, Article 2 (IAC, 2008);

- Federal chronic ambient water quality criteria (AWQC; US EPA, 2006);

- Alternative surface water screening values will be selected when AWQC, Indiana WQS, and ESLs are not available. These include screening values developed by other US EPA regions, ORNL (Suter and Tsao, 1996), and others.

For those inorganic COPECs to which it is applicable, both dissolved phase and total recoverable screening values will be chosen, and hardness will be expressed as 50 mg/L $CaCO_3$ unless location-specific hardness data are available.

2.5 Conceptual Site Model

The end product of the problem formulation step is the development of an ecological CSM. The CSM will summarize the current knowledge of the former Coke Plant and ecological resources potentially at risk. The CSM is a set of working hypotheses regarding how ecological receptors at the former Coke Plant may be exposed to contaminants. The CSM for the former Coke Plant will help to describe the origin, fate, transport, exposure pathways, and receptors of concern. The objectives of the CSM will be to identify the ecologically important exposure and migration pathways, and to specify exposure scenarios that will be evaluated in the SLERA.

3.0 Screening Level Ecological Risk Analysis

During the risk analysis phase, data are evaluated to characterize potential ecological exposures and corresponding effects. The risk analysis phase of the SLERA is based on the CSM developed in problem formulation. The ecological exposure assessment involves the identification of potential exposure pathways and an evaluation of the magnitude of exposure of identified ecological receptors. The ecological effects assessment describes the potential adverse effects associated with the identified COPECs to the ecological receptors and reflects the type of assessment endpoints selected.

The calculation of exposure estimates and risk is done by 1) estimating the level to which an ecological receptor (i.e., plant or animal) is exposed to a particular constituent, and 2) comparing maximum constituent concentrations to ecological screening values (these comparisons result in Hazard Quotients (HQs)). If an HQ is calculated to be equal to or greater than one for a particular constituent, that constituent is then referred to as a COPEC. This terminology is consistent with guidance provided in the US EPA Region 5 Superfund website (http://www.epa.gov/region5/superfund/ecology/). The methods that will be used to identify and characterize ecological exposure and effects are described in the following subsections.

3.1 Data to be Considered in the SLERA

Previous sampling within the former Coke Plant has detected concentrations of metals, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs), including polycyclic aromatic hydrocarbons (PAHs), in surface soils and groundwater. Additional analytes, including ammonia in groundwater, have also been detected. These detected constituents represent the contaminants present at the site and will serve as the basis of the SLERA data evaluation. Steel sheet pile walls along the former Coke Plant adjacent to the Indiana Harbor Canal, prevent deeper groundwater from discharging to the canal; therefore, the groundwater evaluation will focus on the potential discharge of shallow groundwater to the surface water of the canal.

The data for each area and medium will be summarized for use in the SLERA. The following guidance documents will be used to develop the summary statistics and exposure point concentrations (EPC):

- Risk Assessment Guidance for Superfund: Volume I – Human Health Evaluation Manual, Part A (USEPA, 1989).
- Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (USEPA, 2002).

Data for samples and their duplicates will be averaged before summary statistics are calculated, such that a sample and its duplicate are treated as one sample for calculation of summary statistics (including maximum detection and frequency of detection). Where both the sample and the duplicate are not detected, the resulting values are the average of the sample-specific quantitation limits (SSQLs). Where both the sample and the duplicate are detected, the resulting values are the average of the detected results. Where one of the pair is reported as not detected and the other is detected, the detected concentration was used.

Summary statistics will include:

Frequency of Detection: The frequency of detection is reported as a percentage based on the total number of samples analyzed and the number of samples reported as detected for a specific constituent.

Maximum Detected Concentration: This is the maximum detected concentration for each constituent/area/medium combination, after duplicates have been averaged.

Minimum Detected Concentration: This is the minimum detected concentration for each constituent/area/medium combination, after duplicates have been averaged.

Mean Detected Concentration: This is the arithmetic mean concentration for each constituent/area/medium combination, after duplicates have been averaged.

Range of Detection Limits: The range of detection limits for each analyte will be listed. Samples that were diluted because of higher concentrations of detected analytes will be noted because this will cause higher detection limits for non-detected analytes and is not the result of matrix interference with the analysis.

USEPA's ProUCL Version 4.00.02 software (USEPA, 2007a) will be used to calculate Upper Confidence Limits (UCLs). The ProUCL recommended UCL (95%, 97.5%, 99%) will be used as the maximum EPC. Based on information presented in the ProUCL guidance (USEPA, 2007a) regarding minimum sample size and frequency of detection, UCLs will be calculated when at least 10 samples and at least six detected results are available for a constituent. Where too few samples or detects are available, the maximum detected concentration will be used as the maximum EPC. ProUCL version 4.00.02 recommends 10 to 15 or more distinct results for the most accurate and reliable UCL calculation. When fewer than 10 detects are present in the dataset, the calculations will be reviewed individually to determine appropriate UCLs.

3.2 Screening Level Exposure Assessment

The COPECs identified in Section 2.4 will be evaluated through media comparisons against ecological screening values (for lower trophic level receptors) or through food we modeling (for higher trophic level wildlife receptors. For the lower trophic level exposure pathways to be evaluated in the SLERA (e.g., risks to plants, earthworms, invertebrates), the maximum detected concentration for each constituent in each environmental medium (i.e., soil, surface water) will be the maximum EPC used to estimate exposure to constituents in the SLERA. This very conservative method will be used to make sure that potential risks are being fully addressed.

Since higher trophic level receptors are mobile they may be exposed to constituents throughout the area under investigation as they forage for food. Therefore, when sufficient data are available, the UCL will be used to evaluate potential risks to higher trophic level receptors in the food web model. When UCLs can not be calculated, the maximum detected concentration will be evaluated in the food web model.

Only COPECs that exceed Region 5 ESLs (US EPA, 2003) or the lowest of all the Eco-SSLs (i.e., plant, invertebrate, bird, and mammal Eco-SSLs) will be further evaluated in the food chain model.

Potential exposure routes for wildlife receptors include potential ingestion of soil or surface water, as well as ingestion of prey items that have bioaccumulated site-related constituents. The actual amount of exposure by wildlife species depends on a number of factors. A food chain model will be used to evaluate

potential ecological risk via bioaccumulation pathways to representative mammalian and avian receptors that may potentially be exposed to site-related constituents detected in the surface soil or groundwater. Based on current site knowledge, the following receptor will be evaluated in the SLERA:

- Belted Kingfisher (*Ceryle Alcyon*) represents carnivorous birds that might be feeding upon aquatic organisms (e.g., fish, invertebrates) found in the Intake Flume or the Indiana Harbor Canal. There are no shorelines or mudflats associated with the former Coke Plant, thus wading shorebirds are not likely to be a receptor at the site.

If the site visit identifies complete exposure pathways at the former Coke Plant, then the following receptors will also be evaluated:

- Short-tailed shrew (*Blarina brevicauda*) represents mammalian omnivores that might be present at terrestrial habitat found at the former Coke Plant; and

- American Robin (*Turdus migratorius*) represents avian omnivores that might be present at terrestrial habitat found at the former Coke Plant.

The primary source of exposure assumptions for these receptors will be the US EPA Exposure Factors Handbook (US EPA, 1993b) and supporting documentation for the recently developed Ecological Soil Screening Levels (Eco-SSLs; US EPA, 2005, US EPA, 2007b). Exposure parameters for wildlife receptors are summarized in Table 1. Although actual dietary distributions are presented in Table 1, as recommended for SLERA evaluations, it will be assumed that the species in question feed only on the most contaminated food type of all the types that it eats (i.e., 100% of the diet comes from the most contaminated prey item).

To estimate potential exposure in the food chain mode, a Total Daily Dose (TDD) will be estimated for each representative wildlife species. The TDD calculation considers the following factors: concentrations of the COPECs in the food items that the species would consume, estimated amounts of abiotic media (e.g., soil) that it would incidentally ingest, the relative amount of different food items in its diet, body weight, food ingestion rates, and species-specific area use factors (AUFs) and exposure durations (EDs). An AUF is defined as the ratio of the area of organisms' home range to the available habitat area within the area under investigation. The ED represents the percent of the year that the receptor forages within the area under investigation (i.e., 100% for non-migratory species).

The following generalized equation will be used to evaluate the TDD from each source (i.e., food or prey item, incidental ingestion):

$$TDD\ (mg/kg_{BW}/day) = \frac{(Tissue\ or\ Media\ Concentration \times Ingestion\ Rate \times AUF \times ED)}{Body\ Weight}$$

For the SLERA, it will be conservatively assumed that the wildlife receptors are present within the area under investigation 100% of the time (i.e., AUF of 1 and an ED of 100%) and constituents are 100% bioavailable to biota.

3.3 Screening Level Ecological Effects Assessment

The purpose of the effects assessment is to summarize available toxicological data, establish ecologically-based screening values, and present ecologically relevant field observations. Ecologically-based screening values are constituent specific and can be either media specific (e.g., soil concentrations associated with toxicity) or dose-specific (e.g., toxicity reference values (TRVs) based on dietary exposure).

As described in Section 2.4, maximum constituent concentrations (and detection limits) will be compared against risk-based screening levels to identify COPECs and assess potential risks to plants, soil invertebrates, fish, aquatic invertebrates, and benthic invertebrates.

Constituents in excess of the Region 5 ESLs (US EPA, 2003) or the lowest of the Eco-SSLs will be evaluated within the food chain model.

The TRVs used to evaluate the potential for risks to vertebrate wildlife receptors relate the dose of a COPEC from oral exposure with a potential adverse effect. For each bioaccumulative COPEC, ecotoxicological literature will be reviewed to identify a sub-lethal chronic exposure TRV representing a threshold body weight-normalized dose for sub-lethal effects. Sub-lethal effects are defined as those that impair or prevent reproduction or growth. The sub-lethal TRV reflects the assessment endpoint chosen as the basis for establishing risk from chronic exposures. TRVs selected for the SLERA will be based on no-observed-adverse-effect-levels (NOAELs). If no toxicity information is available for a COPEC, and it is not possible to identify TRVs, risks associated with the estimated exposure for the respective COPECs will not be quantitatively evaluated. The primary sources of TRVs will be:

- TRVs derived according to US EPA guidance (US EPA, 2005) as part of the development of the US EPA Eco-SSLs; and

- TRVs developed by ORNL (Sample, et al., 1996).

These ecological screening values are based on conservative endpoints and sensitive ecological effects data. They represent a preliminary screening of site-related constituents to determine if there is a need to conduct further investigations at the former Coke Plant.

4.0 Screening Level Ecological Risk Characterization

The results of the SLERA will be analyzed and interpreted to determine the likelihood of adverse environmental effects, and to determine whether a conclusion of no significant risk can be reached for each assessment endpoint evaluated. The ecological risk characterization will summarize the results of the risk analysis phase of work and will provide interpretation of the ecological significant findings. Aspects of ecological significance that will be considered to help place the sites into a broader ecological context include the nature and magnitude of effects, the spatial and temporal patterns of effects, and the potential for recovery once a stressor has been removed.

4.1 Characterization of Potential for Ecological Risk

Individual measurement endpoint results will be evaluated to determine whether or not they support a finding of no significant risk for each assessment endpoint. Factors to be considered will include the strength of association between the assessment and measurement endpoint, the data quality, and the temporal and spatial representativeness of the data.

As indicated in Section 3.2, the COPECs identified in Section 2.4 will be evaluated through media comparisons against ecological screening values (for lower trophic level receptors) or through food web modeling (for higher trophic level wildlife receptors). By evaluating the maximum EPCs in the environmental media and conservative ecological screening values, the SLERA is designed to minimize chances of eliminating a COPEC from further consideration when it may pose an actual ecological risk. In the SLERA, potential risk will be estimated by calculating screening hazard quotients (HQs). Screening HQs will be calculated by comparing constituent EPCs (or doses) to the appropriate ecological screening value using the following formula:

Hazard Quotient = EPC/Ecological Screening Value

When the maximum HQ is less than 1 (i.e., the maximum EPC or dose is less than the ecological screening value or TRV), exposure to the constituent is assumed to fall below the range considered to be associated with adverse effects for growth, reproduction, or survival of individual receptors, and no population level risks are assumed to be present. For HQ values greater than 1, further evaluation of potential risk may be warranted. The constituents with HQs above 1 are referred to as COPECs and may require additional evaluation.

Exceedances of the ecological screening values may indicate the need for further evaluation of the potential ecological risks posed. The decision concerning the necessity for further evaluation requires the weighing of such factors as the frequency, magnitude, and pattern of these exceedances.

4.2 Characterization of Uncertainties

Uncertainty is "the imperfect knowledge concerning the present or future state of the system under consideration; a component of risk resulting from imperfect knowledge of the degree of hazard or of its spatial and temporal distribution" (US EPA, 1997). Uncertainties may lead to an overestimate or underestimate of risk and are associated with each stage of the risk assessment process. It is important to acknowledge these uncertainties, and the influence they have limiting characterization of ecological risks with a high degree of certainty.

The documentation of the risk characterization will include a summary of assumptions, uncertainties (both generic and site-specific), strengths and weaknesses of the analysis phase of work, and justification of

conclusions regarding the ecological significance of the estimated (i.e., risk of harm) or actual (i.e., evidence of harm) risks.

Although it is not practical to account for all sources of uncertainty, it is important to identify and address the major elements of uncertainty in the risk evaluation and assessment. Some uncertainties bias the results of the risk assessment towards excessive risk, while others bias towards no significant risk. Once identified, the uncertainties will be classified by this bias, and the overall effects on the risk assessment will be reflected in the conclusions.

4.3 Conclusions

Based on the SLERA, decisions can be made to determine which COPECs and pathways warrant further evaluated in a Baseline Ecological Risk Assessment (BERA) and which COPECs and pathways can be eliminated from further consideration because they are unlikely to pose a significant risk. Following the SLERA, decisions will be made in consultation with US EPA Region 5 based on the determination of potential ecological risks. Thus, three possible courses of action can be reached following the SLERA (US EPA, 1997):

1. There is adequate information to conclude that the potential for ecological risk is negligible and therefore there is no need for remediation on the basis of ecological risk.

2. The information not adequate to make a decision at this point, and the ERA process will continue.

3. The information indicates a potential for adverse ecological effects, and a more thorough assessment is warranted.

If the SLERA indicates that further investigation is warranted, it is anticipated that a sub-tier of Step 3 (Step 3a) of the US EPA's eight-step ecological risk assessment process will be conducted. US EPA (2001) guidance provides the basis to introduce sub-tiers into the SLERA process. Step 3a, a sub-tier of Step 3, serves to refine the list of COPECs identified in the conservative evaluation conducted in Steps 1 and 2 by considering additional site-specific factors. Only COPECs, pathways, and receptors retained in Step 3a would be subject to additional evaluation within a BERA. In many cases, the Step 3a refined risk estimate provides the basis for defining potential risk drivers which may be further evaluated for remedial decisions, or alternatively a complete BERA may be initiated, which applies USEPA Step 3b through Step 8 of the process. It is anticipated that the COPEC refinement step will include additional consideration of essential nutrients, frequency of detection, non-detected constituents, and consideration of more site-specific assumptions for the food web model (e.g., realistic dietary distributions), and alternative TRVs (e.g., TRVs based on low-observed-adverse-effect-levels (LOAELs). Other site-specific information identified during the site visit or other on-site investigations may also be incorporated into the COPEC refinement step.

If warranted, the SLERA risk characterization will provide recommendations for any additional sampling and evaluation to help reduce risk assessment uncertainties in a BERA.

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TABLES

Table 1 – Exposure Parameters for Wildlife Receptors

TABLE 1
EXPOSURE PARAMETERS FOR WILDLIFE RECEPTORS

Receptor Species	Body Weight (kg)	Assumed Diet Fraction of diet as %; Amount as kg $_{ww}$/day [1]					Food Ingestion Rate (kg $_{dw}$/day)	Abiotic Media in Diet Fraction of diet as %; Amount as kg $_{dw}$/day [2]	Water Intake Rate (kg/day)	Exposure Duration (unitless)	Area Use Factor (unitless)
			Terrestrial Plants	Terrestrial Invertebrates	Fish	Aquatic Invertebrates					
Short-tailed Shrew *(Blarina brevicauda)*	0.0173 [a]	%	25% [b]	75% [b]	-- [b]	-- [b]	0.0036 [c]	2.4% [e]	0.0026 [f]	1 [g]	1 [h]
		kg/day	0.0039 [d]	0.0169 [d]	--	--		0.00009			
American Robin *(Turdus migratorius)*	0.081 [a]	%	50% [b]	50% [b]	-- [b]	-- [b]	0.0194 [c]	10.4% [e]	0.0110 [f]	1 [g]	1 [h]
		kg/day	0.0423 [d]	0.0608 [d]	--	--		0.00202			
Belted Kingfisher *(Ceryle alcyon)*	0.147 [a]	%	-- [b]	-- [b]	73% [b]	27% [b]	0.0230 [c]	1.0% [e]	0.0163 [f]	1 [g]	1 [h]
		kg/day	--	--	0.0671 [d]	0.0310 [d]		0.00023			

General Notes:
kg = kilogram
dw = dry weight
ww = wet weight

Water content of prey organisms and vegetation as listed below (US EPA, 1993)
77% Terrestrial plant
84% Terrestrial invertebrate
75% Fish
80% Aquatic Invertebrate (average of bivalves and shrimp)

Food ingestion rates are wet weight for food items and dry weight for soil ingestion. As needed, rate may be converted.
[1] Amount as kg $_{ww}$/day is based on the fraction of food item in the diet, the food ingestion rate (kg $_{dw}$/day), and the water content of the food item.
$Food_i$ in diet (kg $_{ww}$/day) = {(Proportion of $food_i$ in diet) x (FIR $_{dw}$) / (1-moisture $content_i$)}
[2] Amount as kg $_{dw}$/day is based on the fraction of abiotic media in the diet and the food ingestion rate (kg $_{dw}$/day).
Soil in diet (kg $_{dw}$/day) = {(Proportion of abiotic media in diet) x (FIR $_{dw}$)}

See individual organism notes for source, units, and conversion.

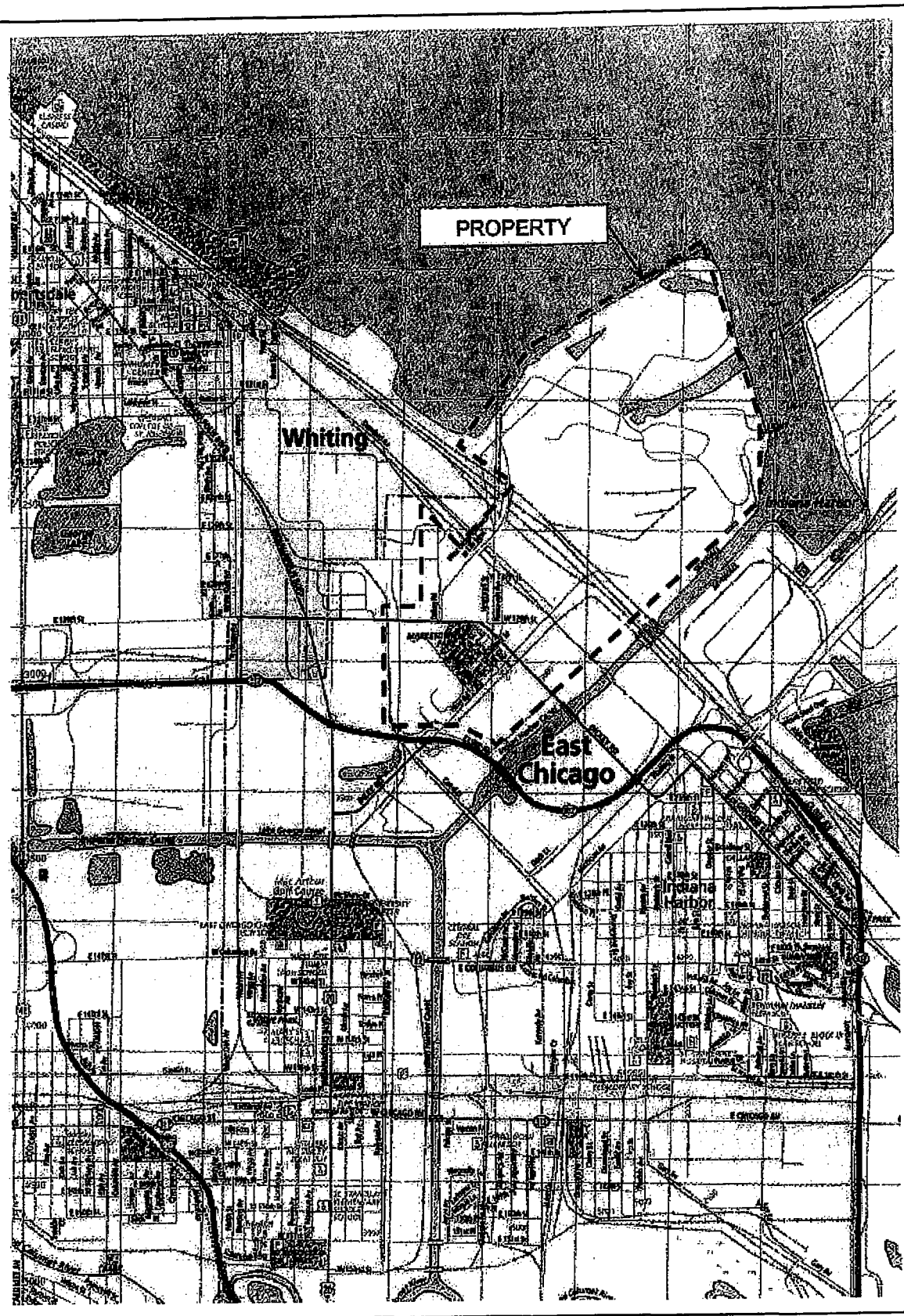
Notes for Short-tailed shrew
[a] Average body weight of adult male and female shrews in Pennsylvania (US EPA, 1993).
[b] Diet based on stomach contents measured in June through October in New York (US EPA, 1993). *Diet for SLERA will represent 100% most contaminated food item.*
[c] Food ingestion rate represents the high end point estimate for food intake of 0.209 kg dw/kg bw/day (US EPA, 2007b).
[d] Dry weight food ingestion rate converted to wet weight food ingestion rate:
FIR_{ww} = Sum {{(Proportion of $food_i$ in diet) x (FIR_{dw})} / (1-moisture $content_i$)}
[e] Estimate for meadow vole used to represent shrew (US EPA, 1993).
[f] Estimated using equation developed by Calder and Braun, 1983 (as cited in US EPA, 1993) where $WI = 0.099*Wt^{0.90}$
[g] Exposure duration set at default of 1. Receptor assumed to be present and actively foraging year-round.
[h] Area use factor set at default of 1. Receptor assumed to obtain entire diet from exposure area.

Notes for American robin
[a] Average body weight of adult male and female in studies from Pennsylvania and New York (US EPA, 1993).
[b] Diet based on annual average for adults in the central United States (US EPA, 1993). *Diet for SLERA will represent 100% most contaminated food item.*
[c] Food ingestion rate represents the high end point estimate for food intake. Typical values for robins in California and Kansas (US EPA, 1993) converted to dry weight values, averaged, and multiplied by 1.25 to estimate high end (US EPA, 2007b).
[d] Dry weight food ingestion rate converted to wet weight food ingestion rate:
FIR_{ww} = Sum {{(Proportion of $food_i$ in diet) x (FIR_{dw})} / (1-moisture $content_i$)}
[e] Woodcock soil consumption rate used as surrogate for American robin (Table 4-4; US EPA, 2007).
[f] Estimated using equation developed by Calder and Braun, 1983 (as cited in US EPA, 1993) where $WI = 0.059*Wt^{0.67}$
[g] Exposure duration set at default of 1. Receptor assumed to be present and actively foraging year-round.
[h] Area use factor set at default of 1. Receptor assumed to obtain entire diet from exposure area.

Notes for Belted kingfisher
[a] Mean body weight of adult male and female kingfishers in Pennsylvania and Ohio (EPA, 1993).
[b] Diet based on summer averages from studies in Michigan, Nova Scotia, and Ohio (EPA, 1993). *Diet for SLERA will represent 100% most contaminated food item.*
[c] Food ingestion rate represents the high end point estimate for food intake. Typical value for adults in lower Michigan (US EPA, 1993) converted to dry weight value and multiplied by 1.25 to estimate high end (US EPA, 2007b).
[d] Dry weight food ingestion rate converted to wet weight food ingestion rate:
FIR_{ww} = Sum {{(Proportion of $food_i$ in diet) x (FIR_{dw})} / (1-moisture $content_i$)}
[e] Estimated value based on minimal sediment ingestion.
[f] Estimated using equation developed by Calder and Braun, 1983 (as cited in US EPA, 1993) where $WI = 0.059*Wt^{0.67}$
[g] Exposure duration set at default of 1. Receptor assumed to be present and actively foraging year-round.
[h] Area use factor set at default of 1. Receptor assumed to obtain entire diet from exposure area.

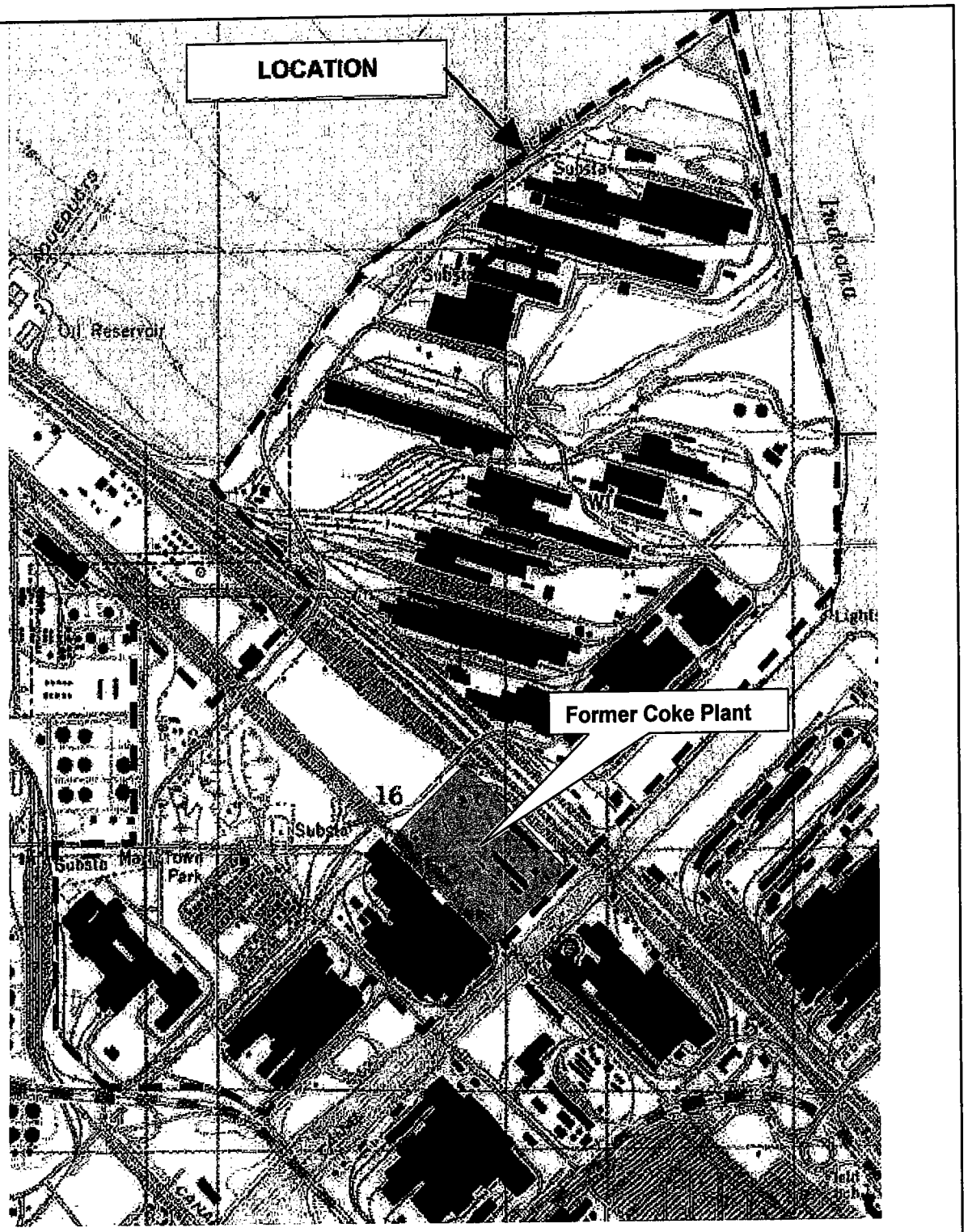
FIGURES

Figure 1 – Location Map
Figure 2 – Site Layout
Figure 3 – US EPA 8 Step Ecological Risk Assessment Framework



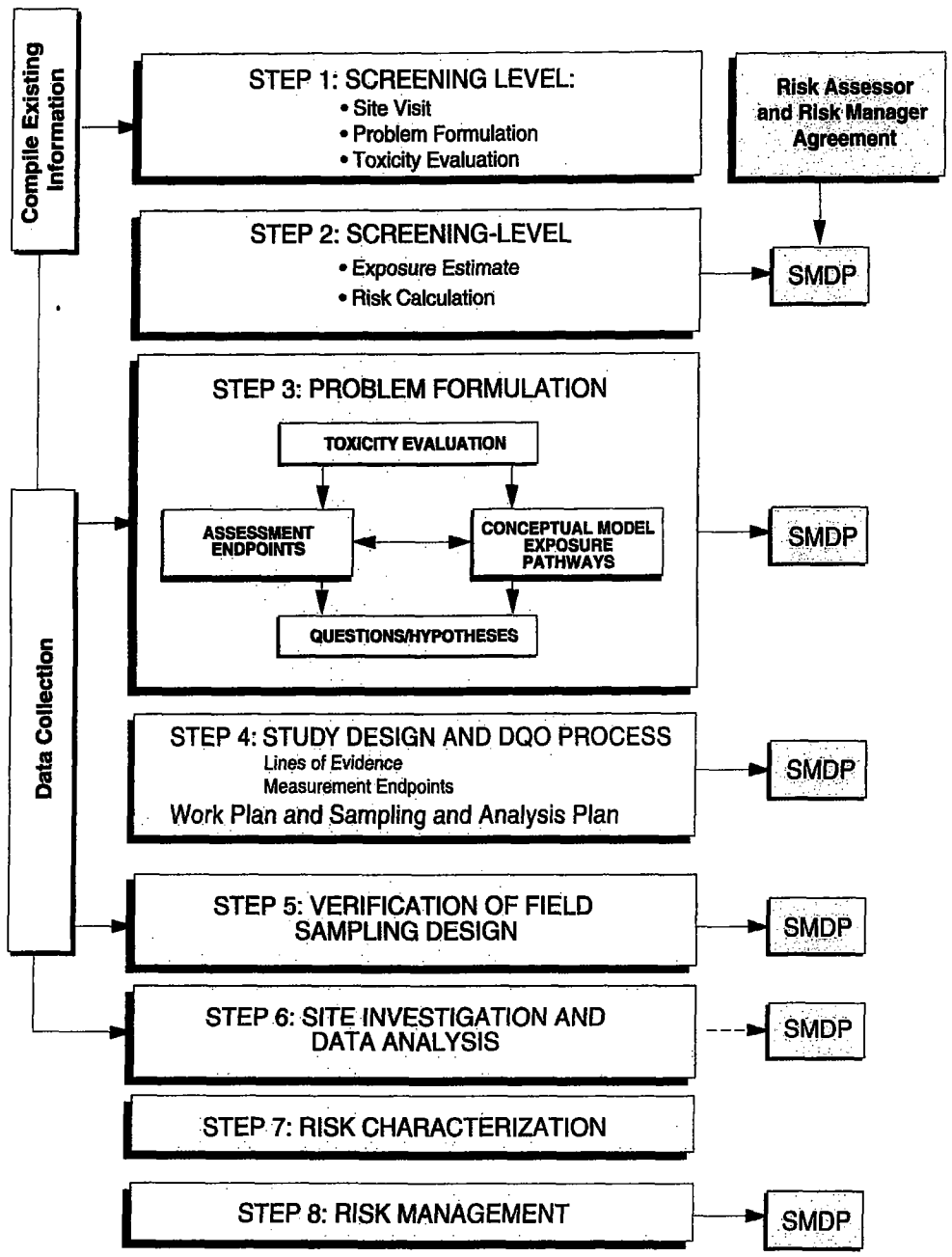
Approx. Scale: 1:3700	Source: Lake County Street Map (Rand McNally, 2001)	3001 Dickey Road East Chicago, Indiana January 2010 Job No. 60147001	**Figure 1** **Location Map**

K:\projects\12084 - ArcelorMittal Indiana Harbor\12084004-SLERA\SLERA_Work_Plan_Rev_2\F60147001-Fig_1-Location_Map.doc



Approx. Scale: 1:28,000	Source: USGS 7.5 Minute Topographic Map Whiting, IN 1998	3001 Dickey Road East Chicago, Indiana January 2010 Job No. 60139026	**Figure 2** Site Layout former Coke Plant

Figure 3 US EPA 8 Step Ecological Risk Assessment Framework



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Note: SMDP=Scientific Management Decision Point

Appendix A

Photographs of the former Coke Plant

Looking east toward canal

Looking north-northwest during surface placement-note geotextile

Looking west MW-801S and D behind blue-cab truck

Looking south

STS CONSULTANTS, LTD.

Response to US EPA's Work Plan Comments of March 16, 2004 ISG Indiana Harbor & Tecumseh Redevelopment

RCRA Docket No. R3013-5-03-002
Site EPA ID No. IND 005 462 601

ISG Indiana Harbor, Inc.
Tecumseh Redevelopment, Inc.
East Chicago, IN

STS Project No. 1-08741Y

ATTACHMENT

General Guidance

A) Proposal to Characterize Slag Fill

Slag fill has to be sampled and characterized to meet the needs of human health risk assessment, ecological risk assessment and groundwater contamination. In order to meet the needs for risk assessment, it is recommended that pH, metals and SVOCs in slag samples from unimpacted areas up to 12 ft depth are analyzed from the provided parameter list. The number of samples proposed in Table 5.1 of volume 1 for background (3 fill samples each from 12 sample locations totaling 36, e.g., 0-2 ft, 2-6ft and 6-12ft) is acceptable for the first phase of analysis. For metals analysis, samples should be analyzed for major constituents (iron, manganese, aluminum, magnesium and sulfur) separately from minor metal constituents (aluminum, antimony, arsenic, cadmium, total chromium, hexavalent chromium etc) so that the lowest level of human health and ecological based detection limits can be achieved. Based on the justification of sample locations (applicable to individual groups) and the relevance of detected constituents from the SWMU based wastes, the characterized slag data may be used as a. surrogate for slag background concentration.

Response:

The number of samples proposed from each boring in Table 5.1 for the background analysis of slag was initally 24 samples or two per boring for chemical analysis. However, the work plans have been revised to include a third sample where sufficient unsaturated slag-fill is present.

B) Proposal for facility Hydrological Investigation

As required in paragraph 52.C of the June 2003 Administrative Order, the written proposal to be submitted to U.S. EPA, shall be specific and shall include a "work plan to evaluate the hydrogeologic conditions at the facility...". See facility as defined in 40 CFR 260.10. Due to the size (1200 acres) of the ISG facility, the history of land use, various alterations to the initially relatively flat-lying re-claimed land in the Lake and the general absence of detailed knowledge of the hydrologic conditions underlying the facility, the current sampling plan in the proposal is deficient for investigating the impact of the onsite SWMUs on the groundwater beneath the facility.

Response:

The peninsula is not "re-claimed" land, but "made land" constructed under permit for the intended purpose of steel production. The expansion into the lake was approved by the State of Indiana, approved by the Corps of Engineers and actively encouraged by the federal government as a way to increase steel production in the United States. The land was made specifically to be used for steel production; the historic use is unchanged except for those technological changes within the steel industry.

While STS, ISG-Indiana Harbor, Inc. (ISG-IH) and Tecumseh Redevelopment, Inc. (Tecumseh) do not concede that the initial approach was deficient, we have revised the sampling proposal to incorporate additional monitoring wells and sampling as requested by US EPA. We respectfully comment that we continue to support US EPA Region 6's Corrective Action Strategy (CAS) approach as a cost effective and phased approach. However, in the interest of moving the project forward, we have set aside this innovative and cost effective approach from our proposal and are presenting a "traditional" phased approach.

U.S. EPA requires the facility to first characterize the existing hydraulic conditions. The U.S. EPA prefers a phased approach to developing the necessary conceptual site model that is constructed around

geologic and hydrologic data gathered at the facility. The phased approach will also afford the scientific and otherwise benefits of allowing data gathered in any single episode to be thoroughly validated and interpreted such that any additional field work, if necessary, will be unambiguously used to fill knowledge gaps. Given the above, the U.S. EPA recommends a limited first phase of ground-water monitoring wells be undertaken. The accompanying map indicates 26 proposed locations of monitoring wells and/or monitoring well nests. The nests will be necessary to ascertain vertical gradients that most certainly exist in the area. The locations will be required to be nested such that crucial hydraulic and chemical questions may be answered at this initial phase. The nests target stratigraphic horizons should generally be; 1) the shallow and/or water-table; 2) intermediate - the interface between the fill, if it exists, and the top of the calumet sands; and 3) deep - tagging the underlying aquitard clays with screening on top of the calumet sand. Data collected from this effort will be used to build our understanding of the hydrology, whether it is complex, whether or not discrete floating or dense immiscible chemicals exist and whether or not there exist potential for contaminants migration to surface-water from the ISG facility. A valid conceptual site model built upon these field facts would allow for a further intelligently designed SWMU investigation be undertaken.

Response:

STS has provided additional data to support our conceptual site model. Based on the conceptual model and our meeting in Chicago on April 20, 2004, we have revised the work plans to incorporate additional groundwater monitoring locations, including both piezometers and water table wells.

Additional, hydraulic products expected to come from this initiai work are listed below.

1) An initial Isopach map showing fill thicknesses across the site

2) AN initial map showing the type of fill, i.e. hot-pour slag, rubbleized slag, etc, with potential evolution of fill used to develop new land (useful for many reasons, one of which is location aquatards, if any).

3) Description and interpretation of ground-water quality and correlation with fill type, will assist to focus additional efforts on appropriate areas of site/SWMUs.

4) A topographic map of the top of the calumet sand surface (useful to understand potential presence of LNAPL and flow directicns)

5) Topographic map of the top of the clay layer (under calumet sand, useful to determine potential DNAPL presence and flow routes)

6) Hydraulic head distributions in nested wells (indicates nature of vertical hydraulic gradients, if any)

7) Most importantly, cross-sections through the ISG site aiding in developing ground-water flow maps and areas of interest to focus second phase of hydraulic investigation.

Response:

STS will include the requested figures in the hydrogeologic report. Surface contour maps of the top of the slag-fill and the top of the sand as well as isopach drawings depicting the slag-fill and sand thickness across the ISG/Tecumseh properties as well as two cross-sections have been prepared and are included in the revised work plans. These drawings were used to develop the Conceptual Site Model Diagrams presented in each of the work plans. The drawings will be refined and updated as additional information becomes available during the investigation.

C1.) A proposal to collect and Analyze SWMU Waste Samples

The general approach to sample collection from any SWMU is to design a grid over the entire surface area of the SWMU. The grid could either be 5'x5' or 10'x10'. Samples should be collected at random from the grid. The number of samples collected is dependent on grid size. At each random sample location, samples should be collected from the entire depth horizon, at different depth starting from the surface. Compositing of samples at each location may be allowed, depending on the nature of the samples. Compositing of the entire samples from one SWMU will not be representative, except it can be proven that the material in the SWMU is a Monofil.

Response:

A revised soil sampling approach is provided in the Soil Sampling and Analysis Work Plan.

The U.S. EPA requires that the above sampling approach be implemented at Unit No. 1- The Blast Furnace Filter Cake Pile, Unit No. 67 & 68 - The Sinter Plant Stock Piles, Unit No. 8- The Terminal Lagoon, Unit No. 9 - The Oil Skimmer Tank, Unit No. 10- The Sludge Pits, Unit No. 23- The Filter Backwash Pile, Unit No, 24- The North Lagoon, Unit No. 26, - The Old Sludge Pit and Unit No. 47- The Central Waste Treatment Plant Sludge. The accompanying list of parameters should be analyzed in all of the samples collected from the above SWMUs. This list of compounds can the be paired down depending on the outcome of the groundwater sampling results generated from the hydrological investigation above.

Response:

The US EPA-requested list of parameters will be initally used for slag-fill, soil, sediment and groundwater. This has been incorporated into the revised work plans.

Due to the magnitude of Unit No. 7- (The Hill), we recommend the following sampling approach: (1) collection of random surface samples from the entire surface area based on a 10' x 10' grid, (2) At each surface sample location, collect another sample at the 1' interval, and (3) collection of random surface samples from the base of "The Hill". Collected samples should also be analyzed for the provided parameter list.

Response

The proposed sampling approach for SWMU No. 7 ("the Hill") has been revised to incorporate a grid sampling approach (see the Soil Sampling and Analysis Work Plan).

C2) A proposal to collect and analyze Surface and Sediment samples

To determine potential ecological impacts from the North Lagoon, the Intake plume and the Former Coke Plant, surface water and sediment samples should be collected from these areas as follows:

The North Lagoon: While this area provides little to no habitat in terms of vegetation, vegetative structure or prey, there exists a complete exposure pathway - waterfowl will try to feed thereby becoming exposed to contaminated media through opportunistic incidental ingestion of sediment and water and b) the lagoon has a history of Clean Water Act violations and the sediments may be highly contaminated and c) the lagoon may be a secordary source of contamination to the lake through A groundwater connection. A minimum of five samples each of surface water and sediments should be collected from the North Lagoon for analysis.

Response:

Pursuant to the US EPA's letter of April 27, 2004, it is our understanding that surface water samples from the North Lagoon are no longer required by the Agency. The collection of sediment (wastewater residuals from the base of the treatment pond) samples from the North Lagoon is discussed in the Sediment Sampling and Analysis Work Plan. The work plan has been revised so that the 7 surface sediment (i.e. top two feet) samples (i.e. top two feet) are analyzed as 7 individual (discrete 2-foot zone) samples.

Intake Flume Including area between the breakwater & Shoreline: A minimum of five surface water and sediment samples each should be collected for analysis. This area is heavily used by waterfowl and there is a complete exposure pathway. Contamination may occur through groundwater/surface water discharge, surface water runoff, and surface water currents.

Response:

The intake flume area is not listed as SWMU or an AOC in the original order. At this time, no sampling in the intake flume has been proposed. With regard to the relationship between Clark Landfill and the intake flume, the Landfill failure and subsequent actions following the failure are discussed in additional detail in the revised work plans.

Nearshore area within the River and Harbor Channel: A minimum of five samples adjacent to the Former Coke Plant and five sediment samples between the Former Coke Plant between water edge and future dredging locations and the Intake Flume should be collected for analysis. Contamination may occur through groundwater/surface water discharge and surface water runoff. The retaining wall may leak; may not be entire, and may or may not be anchored deeply enough. All samples collected from these three areas should be analyzed for the chemicals in the Parameter List.

Response:

No off-site surface water or sediment sampling is necessary or proposed within the River and Harbor Canal per the US EPA letter dated April 27, 2004.

Former Coke Plant & Open area west of the Former Coke Plant Areas: These areas have complete exposure pathways and a minimum of five soil samples each should be collected for analysis. All samples collected from these three areas should be analyzed for the chemicals in the Parameter List. For soil sampling, depth of samples should not exceed two feet.

Response:

Five surface slag-fill samples are planned and will be collected from the interval from the ground surface to two feet below ground surface" at the AOC (coke plant) as described in the Soil Sampling and Analysis Work Plan. These samples will be analyzed for the parameters on the US EPA-requested list.

Specific comments to the Proposal

I. GENERAL COMMENTS

1. In the November 2003 ISG Sampling Work Plan (Work Plan), Volumes 1 through 4, Sections 2 and 3, there are references to borings, monitoring wells, and residuals sampling that were completed during previous investigations. For example, Volume 1 Section 2.3.2 (pg. 8) cites four proposed monitoring wells at Unit No. 20; Section 2.3.4 (pg. 11) cites three geotechnical borings completed at Unit No. 7; Section 2.3.5 (pg. 11) cites "historical boring data" from Unit No. 73 and the same section (pg. 12) cites 11 monitoring wells; Section 2.3.8 (pg. 15) cites direct-push

groundwater samples collected from the area of concern (AOC); and Section 3.3.2 (pg. 5) cites 300 boring logs that were used to develop the site-specific geology These references to previous investigations are useful; however, little information is provided regarding the specifics of these investigations, and it is unclear if all previous investigations are referenced. A clear understanding and accounting of the field and analytical work conducted previously is critical to developing an understanding of site conditions and providing the level of detail necessary to evaluate proposed sampling activities.

Response:

The 300 borings were primarily geotechnical borings that provide a basic description of the slag-fill and soil encountered for engineering purposes. Little to no chemical data was collected from them. A table listing the majority of the geotechnical borings and the available environmental investigations is included in the revised work plans. In addition, STS proposes to use seven existing groundwater monitoring wells (five water table wells and two piezometers) as part of the proposed groundwater monitoring network.

Volumes 1 though 4, Section 5, present the rationale for the proposed sampling plans. These volumes are also incomplete, because, with the exception of some boring logs and limited analytical results included as Appendices A and B of Volume 3, the analytical results of previous field investigations are not presented or discussed. Proposed monitoring well/boring locations are discussed and illustrated in figures, and proposed analyte lists are provided. However, it is not possible to evaluate the proposed sampling locations and proposed analyte lists without an understanding of the methodologies and results of previous investigations.

Response:

Limited historical chemical data is available for the SWMUs or AOC and the quality of the analytical data in those reports could not be substantiated to the degree required by the Region V QAPP Instructions (1998). Thus, the data was not relied upon to select analytes or sampling locations.

Tthe rationale for proposed investigations at the SWMUs has been revised in the work plans based on the soil boring and groundwater level information available (see the Conceptual Site Model Diagram discussion in the work plans).

In summary, the Work Plan does not contain sufficient information for evaluation of proposed sample locations and analytical requirements. There are two data deficiencies in Volumes 1 through 4: Sections 2 and 3 do not include a summary of previous investigations and an accounting of previous field and analytical work, and Section 5 does not include the analytical results needed to support the proposed sample locations and analytical requirements. Assuming historical data collected during previous investigations were utilized to select proposed sample locations and analytical requirements in the Work Plan, this information should be included. The section should reference a table(s) that presents an accounting of all soil borings, temporary wells, monitoring wells, process water wells, test pits, trenches, staff gauges, or any other investigative field method used to characterize site conditions. For soil borings, the table(s) should provide, at a minimum, a completion date, boring depth, sample intervals, and analyte lists. For wells, the table(s) should provide, at a minimum, a completion date, screened interval, target aquifer, total depth, analyte list, and whether the well is functional and could potentially be of service for future monitoring purposes. The location of all borings, wells test pits, trenches, and staff gauges that were completed during previous investigations should be illustrated on maps provided in the Work Plan. Section 5 of Volumes 1 through 4 should be revised to include a discussion and tabular summary of analytical results. These data should be used to justify the lists of constituents proposed for laboratory analysis and the proposed sampling locations. In addition, all figures used to illustrate proposed sample locations should be revised to include the

locations and associated analytical results of wells, borings, test pits, and any other investigative field methbds.

Response:

The revised work plans include a summary table of the prior reports and available data regarding depth of the borings, or screened intervals for any monitoring wells etc. This soil data and groundwater data was incorporated into the Conceptual Site Model Diagram to more clearly describe the rationale for the selection of the sample locations.

2. Paragraph No. 52 of the AO (pg. 14) specifies that the sampling and analysis work plan should address "the nature and extent of the hazard posed by the hazardous wastes that are present at or that may have been released from the portions of the facility owned and operated by each Respondent." In addition, Paragraph No. 52.A of the AO (pg. 14) specifies the collection of soil and groundwater samples at the 14 SWMUs and one AOC and the collection of sediment samples at two SWMUs. Groundwater and soil sampling at each unit is required for several reasons, including, but not limited to the large size of the facility, the apparent scarcity of field data available for characterizing the site conditions, the long history of operations by several owners dating back to the 1920s, and the need for direct measurement of the nature and extent of potential contamination at each of the 14 SWMUs and the AOC.

Response:

Tthe work plans has been revised to include soil and groundwater sampling at the SWMUs and the AOC as required by the above comment. As discussed previously, we have eliminated our intial phased, CAS-based approach at the US EPA's direction.

The Work Plan does not specify groundwater and soil sampling at each of the SWMUs/AOC identified in the AO. Instead, the decision to proceed with soil sampling is sometimes based on modified synthetic precipitation leaching procedure (SPLP) method results of residual samples (i.e. Unit Nos. 1, 67 and 68). The decision to proceed with groundwater sampling is in some cases based on SPLP results of residuals (i.e. Unit Nos. 1, 67, and 68), SPLP results of sediment (lagoon sludge) (i.e. Unit Nos. 8 and 24), or SPLP results of soil samples (i.e. Unit Nos. 10 and 26). This methodology does not comply with the requirements of the AO. Soil and groundwater sampling should be conducted at each SWMU/AOC identified in the AO. SPLP results should not be used as the basis for deciding whether soil and groundwater quality are characterized through sampling and laboratory analysis. SPLP analysis is not an acceptable method in RCRA corrective action. Region 5 quality assurance policy does not authorize use of SPLP to be performed in lieu of groundwater sampling.

Response:

In the interest of moving the project forward, the work plans have been revised to remove all references to SPLP testing.

3. Paragraph No. 52.C on page 14 of the AO requires the Work Plan to "evaluate (based on field data, tests, and cores) the hydrogeologic conditions at the facility." However, the Work Plan does not specify a facility-wide approach to the assessment of hydrogeologic conditions, as required by the AO. The Work Plan instead proposes a phased, SWMU-based approach. The concern with this approach is that many critical questions, whose answers are necessary to drive future work plans, will remain unanswered after the first phase of work. The SWMU-based approach described in the Work Plan may NOT ultimately, after several phases, provide the level of detail required to understand the hydrogeologic conditions at the facility; however, in order to comply with the AO and obtain an understanding of the groundwater system dynamics earlier in the

process, the Work Plan should be revised to specify the placement of monitoring wells on a site-wide basis. These wells are necessary to begin the process of understanding the dynamics of groundwater at the facility, as specified in the AO.

Response:

The hydrogeologic work plan has been revised to address US EPAs concerns. The hydrological work plan includes groundwater monitoring at each SWMU or group of SWMUs and are proposing twenty-one additional well locations (13 water table wells and 8 piezometers) to aid in understanding the hydrogeologic conditions. In additions, baased on existing geotechnical information the work plans include surface contour maps of the top of the slag-fill, sand, clay and bedrock as well as isopach drawings depicting the slag-fill and sand thickness across the ISG-IH/Tecumseh properties. This information will be refined with the acquisition of the proposed data.

In addition, the AO (Subsection C, Item iv) states that, "the plan shall consider means to determine areas of discharge and recharge of groundwater in the areas likely to be affected by migration of hazardous wastes from the facility." However, the proposed phased approach for installing monitoring wells and assessing the groundwater conditions is poorly sequenced and inadequately constructed and will make this goal difficult to achieve in a reasonable time frame. In order to comply with the AO, make decisions in a timely manner, ensure that there is no imminent threat to human health and the environment, the Work Plan should be revised to include an adequate assessment of groundwater conditions.

Response:

The Groundwater Sampling and Analysis Plan has been revised to include groundwater monitoring at each SWMU or "group of SWMUs" where appropriate due to the close proximity of the areas, as opposed to a phased approach.

4. A detailed review of the adequacy of the sampling and analysis program proposed by ISG for use in an ecological risk assessment is not possible at this time, because ISG has not yet developed a conceptual site model (CSM) or identified ecological habitats and potential receptors that occur at the site. Although the AO (Part 53) specifies that the Work Plan need only document the procedures to be used to identify actual or potential receptors, ISG should revise the Work Plan to include a CSM that clearly describes ecological exposure pathways and receptors for each Group, if practicable. This information will permit more effective decision-making with regard to the adequacy of the proposed sampling and analysis for use in ecological risk assessment. The revised SAP should also specifically list the ecological screening levels to be used. It is important that agreement be reached on receptors and screening levels before the screen is conducted. The Specific Comments detailed below assume that complete ecological exposure pathways do exist at the facility, and a screening-level ecological risk assessment will be required for at least some of the Groups.

Response:

The revised QAPP will contain conceptual site models (in a format taken from Data Quality Objectives Process for Hazardous Waste Sites -US EPA, January 2000) to assist in the site characterization stage of this project. Once the data has been collected and undergone QA/QC review, preliminary risk assessment conceptual site models will be developed using Figure 1 from Example Work Plan to Perform a Screening Level Ecological Risk Assessment (D.J. Mazur, US EPA 5). A site reconnaissance visit by an ecologist wll then occur to finalize these models based on site observations. Revised CSM will then be prepared and used to perform the screening-level risk assessments, which will include a data adequacy analysis.

The ecological screening levels that will be used will be taken from:

- *EPA Region 5 eco-risk screening criteria*
- *Criteria from Efroymson et al. (1997 a,b)*
- *Criteria from US EPA (2000 b)*

and as suggested:

- *US EPA (1999) Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities.*
- *Canadian Environmental Quality Guidelines, 2002.*
- *NOAA's National Status and Trends Program, 1997.*

5. In general, ISG has not provided enough detail in the Work Plan to determine whether the proposed ecological risk assessment procedures are adequate. It is unclear whether ISG intends to follow appropriate ecological risk assessment guidance (e.g., U.S. EPA 1997). Several Specific Comments detailed below address these concerns.

Response:

The work plans have been revised to clarify the ecological risk assessment steps.

6. ISG has not proposed any surface water sampling or groundwater/surface water interface measurements in the Ship Canal, adjacent areas in Lake Michigan, or the lagoons. Furthermore, ISG has not proposed any sediment sampling in the Ship Canal or Lake Michigan. Alternatively, ISG should provide additional information on both current and historic surface water runoff management to justify the assumption that the sediments in the Ship Canal and Lake Michigan have not been impacted by facility operations.

Response:
Pursuant to the US EPA's letter of April 27, 2004, no surface water or sediment sampling beyond the property boundary has been proposed. Surface water runoff from the ISG-IH facility is discussed in the revised work plans.

7. ISG has included analysis of hexavalent chromium in some, but not all, of the soil, sediment and groundwater samples. Because hexavalent chromium is considerably more toxic than trivalent chromium to most ecological receptors, it is always beneficial to measure hexavalent chromium in areas where chromium contamination is expected. In the absence of measured hexavalent chromium, ISG will have to make very conservative assumptions regarding the ratio of trivalent to hexavalent chromium in the ecological risk screening, potentially resulting in overestimated risks. ISG should consider including hexavalent chromium more broadly in the suite of chemical analyses to be performed, or be prepared to use the more conservative assumptions regarding the chromium.

Response:

Hexavalent chromium has been added as an analyte as required by the US EPA-required analyte list.

8. Section 7.2 of the soil, sediment and groundwater Work Plans indicate that historical data will not be used in the risk screening. ISG should note that it may be appropriate to use historical data in areas/media where no new data are collected. In such cases, ISG should provide justification for eliminating historical data from the data set used in the risk screening.

Response:

The limited amount of historical analytical data was not included for consideration in the work plans because the quality of the samples and data could be verified or was not believed to meet the US EPA's standards for use of historical data as defined in the RCRA QAPP Instructions, US EPA Region 5 (1998). As stated previously, geotechnical data is used for sampling location placement.

9. The U.S. EPA Region 6 Corrective Action Strategy (CAS) high-priority and low-priority Bright Line Tables (BLTs) were developed to prioritize sites within the CAS. The values on the high-priority and low-priority BLTs are not intended to be action or cleanup levels. The rationale for ISG's proposal to apply CAS for human health is unclear, because ISG has indicated it will utilize preliminary remediation criteria from Indiana Department of Environmental Management (IDEM) or calculate site-specific risk-based cleanup goals. The high-priority BLTs may indicate what contaminants are driving the risk. Conversely, the low-priority BLTs may indicate what: contaminants are not risk drivers. However, conducting this screening is an unnecessary step, because values on the BLTs are not applicable remediation criteria or cleanup goals for the site and are not going to be the driving force for interim remedial activities or the final remedy.

Response:

Given the US EPA's comments, STS/ISG-IH and Tecumseh are withdrawing the proposal to use the CAS approach and brite-line tables. The work plans have been revised accordingly.

10. First we need to determine how soil background is to be used in data assessment, then we get to locations....The soil and groundwater Work Plans indicate that background data sets will be collected. For soil, a statistically representative sampling effort of background locations representing the types of slag material historically generated at the facility will be collected. According to Table 5-1 in Volume 1, three surface slag and three subsurface soil/slag samples are to be collected at each location. However, the Work Plan (Volume 1) does not indicate how the background concentration will be determined or which background concentration will be applicable to each Group. ISG should present the methodology for the background concentration determination in the Work Plan (U.S. EPA 2001a and 2002a). In addition, the lithology of the soil collected within each Group should be discussed as well as the justification for comparing the data in each Group to a specific background concentration.

Response:

ISG-IH and Tecumseh intends to evaluate the slag-fill based on lithology. However, it is premature to speculate on what will be found until the borings are completed and the lithologies can be compared. It is anticipated that one background concentration may not be appropriate for comparison at all of the SWMUs. As such, ISG-IH and Tecumseh will offer a proposed procedure that will explain the process used to determine which of the background location results are applicable to a particular SWMU in the data quality assessment portion of the results report.

11. For groundwater, ISG proposes collecting groundwater samples from three monitoring wells, which represent slag-impacted groundwater. This approach is not appropriate, because slag-impacted groundwater does not represent background. Background groundwater samples should be collected from wells not impacted by site-related activities.

Response:

Your comment is noted, however, since the entire project area contains slag-fill, no well placement in non-slag-fill areas is feasible. Specifically, the ISG-IH peninsula is constructed primarily of slag-fill into which the water table wells will be screened. STS believes an understanding of the influences of slag-fill

in areas not impacted by plant associated operations is important to understanding water quality at the site.

12. Volume 5 of the Work Plan, the Quality Assurance Project Plan (QAPP) is a "generic" QAPP, which is meant to cover the information for several sampling events to take place at the facility. For each specific sampling event, the QAPP indicates that four "Work Plans" will be issued that will include the specific sampling and analysis information associated with the sampling event. For example, page 33 of the QAPP, Section 1.4.1 states that, "the specific target parameter lists for the Group-specific investigations are presented in the individual Work Plans. Therefore, the parameters presented in the Work Plan could represent a subset of the parameters listed in this QAPP, could be expanded to include additional parameters currently not present in this QAPP, or represent the same lists as those presented in the QAPP." This statement appears to indicate that additional parameters not present in the QAPP may be identified. ISG must ensure that the QAPP identifies all the specific information that will be provided in each Work Plan.

Response:

The QAPP includes all of the parameters proposed for the investigations in the four work plans.

13. To ensure that field and laboratory personnel using the QAPP are able to quickly and accurately use the information provided in the document, provide only information that is specific to the ISG sampling events. Much of the field and laboratory information identified is not associated with the project. For example, a field standard operating procedure (SOP) on flame ionization detector (FID) analyses does not appear to be relevant to this project. Furthermore, Appendix D of the laboratory QAPP provides quality assurance/quality control (QA/QC) requirements for SW-846 Method 8081 and 8082, even though these methods are not applicable to this project. To avoid confusion, only information that is associated with this project should be included in the QAPP.

Response:
The SOP for the FID was included, because an FID may be substituted for a PID in the investigation if it is determined during the site work that an FID may be more appropriate than a PID for field screening. The work plans have been revised to include this potential substitution.

The ISG QAPP included in its Appendix A, a copy of Simalabs internal QAP. This laboratory document was not prepared exclusively for the ISG project, nor will it be modified. The appendices to the lab's general QAP do not apply to the project, nor were they meant to apply to the project. With the permission of the lab, the passages that US EPA finds objectionable will be omitted.

We request that US EPA refer to the project specific tables provided in site QAPP to avoid confusion.

14. The QAPP deviates from *RCRA QAPP Instructions, U.S. EPA Region 5 and EPA QA/R-5* requirements, by failing to describe how the project or task results will be reconciled with the requirements defined by the data user or decision maker. The QAPP must be revised to outline the proposed method that will be used to analyze the data and determine the possible anomalies or departures from assumptions established in the planning phase of data collections. Indicate how the reconciliation with user requirements will be documented, how issues will be resolved, and how limitations on the data will be reported to decision makers.

Response:

A table has been added to the QAPP to address the data requirements, resolution of deviations and reconciliation of issues.

15. The tables associated with the QAPP are inconsistent with regard to the associated methods that will be used for the analysis of parameters. Specifically, the following inconsistencies were found:

- Table 1-3 identifies "SW-846 Method 7471 "for the analysis of mercury in soils and "SW-846 Method 7470 " for the analysis of mercury in aqueous media; however, the QAPP should be revised to indicate that the most recently updated method will be used for analysis. Therefore, the QAPP should be revised to reference SW-846 Methods 7471A and 7470A, respectively;

- Table 1-2 indicates that the solid polynuclear aromatic hydrocarbons (PAHs) will be analyzed by SW-846 Method 8270C. However, several other tables in the QAPP, including Tables 1-5 and 4-1 reference "8270B." Clarify and revise the QAPP to provide the correct analytical method to be used for the analysis, as well as the associated risk-based data quality limits (DQLs), ecological data quality limits (EDQLs), and achievable method detection limits (MDLs).

Response:

The analytical requirements have been changed based on US EPA's comments. The tables have been revised and re-numbered to be consistent with the text..

- Table 1-4 identifies the following methods: "M2320B" and "M4500-CL" for the analysis of alkalinity and chloride, respectively. Clarify the source of these methods; and, if these are non-standard EPA methods, provide a copy for review. Additionally, ensure that the laboratory is capable of performing these methods.

Response:

The laboratory provided the list of methods, therefore, the laboratory is capable of performing the methods. A copy of the source for the method is provided in the revised QAPP.

- Tables 1-5 and 1-7 indicate that, "eight RCRA Metals" will be analyzed by SW-846

Response:

The list of metals has been modified based on US EPA's comment. Tables 1-5 and 1-7 have been deleted and a new table of analytes provided.

- Table 1-4 indicates that "SW-846 Method 9030" will be used for sulfide analysis; however, Table 4-1 references "EPA 376.4." Clarify which method will be used for the analysis, and ensure that the QAPP and the associated tables consistently reference the correct methods to be used

Response:

The tables have been revised to reflect the new parameter list.

- Table 4-1 indicates that the preparation method for hexavalent chromium in soils is "SW-846 Method 3060." Ensure that the most recent updated methods are used for the parameters and revise the table to reference "SW-846 Method 3060A". Additionally, identify the preparation method to be used for the aqueous matrix

Response:

The QAPP tables have been revised.

- The reference for the analysis of sulfate in solid samples should be revised to "375.4 not "357.4" as stated.

Response:

The QAPP has been revised to reflect your comments.

II. SPECIFIC COMMENTS

Soil Sampling and Analysis Plan (Volume 1)

Volume 1, Section 5.1.1, Unit No. 1, Page 1

1. Section 5.1.1 (pgs. 1 and 2) specifies the scope of activities to be conducted at Unit No. 1, the Blast Furnace Filter Cake Pile. Page 2 explains that a composite sample of the filter cake will be collected and analyzed for RCRA metals, zinc, nickel, and PAHs. If the analytical results of the filter cake exceed soil screening criteria, one soil boring will be advanced for the purpose of collecting one surface sample and one subsurface sample to determine if further investigation is necessary. If the filter cake analytical results are below soil screening criteria, soil borings will not be advanced and no soil samples will be collected.

   Paragraph 52.A (pg. 14) of the AO specifies that one of the project objectives is, "to collect arid analyze representative soil.samples to determine the nature and extent of any soil contamination in and around all the SWMUs and AOC identified." As discussed in General Comment No. 2, the AO clearly states that direct measurement of potential soil impacts at each SWMU/AOC is required, and does not provide for exclusions. One surface sample and one subsurface sample does not constitute assessing potential impacts for this unit.

   IN Addition, the proposed methodology in the Work Plan assumes that the composition of the filter cake has not varied since the process was initiated at this unit and that the composite sample will be representative of all current and historic filter cake compositions, which may not necessarily be the case. This assumption is wrong.

   The most effective method for determining the nature and extent of potential soil contamination is the direct method of soil sampling. To assess soil conditions and comply with the AO, the Work Plan should be revised to include several surface and subsurface soil samples at Unit No. 1. Although two soil samples are proposed, they should not be used as the basis for deciding whether soil quality is adequately characterized. According to the Work Plan (pg. 1), the 27-foot by 42-foot concrete storage pad is bounded to the south by a building and to the north and east by a three- to four-foot containment wall, but is open to the west to allow for loading activities. However, the one surface and one subsurface sample proposed (if SPLP residual results exceed screening criteria) in the Work Plan (pg. 2) are not adequate to characterize potential releases from this area. In addition to the soil boring specified in the Work Plan, additional surface soil sampling is necessary. This additional sampling should include the base of the concrete pad and outward to a distance of approximately 20 feet to the west.

Response:

The proposal in the work plan has been revised.

In addition, Section 5.1.1 (pg 2) specifies that a portion of the filter cake will be analyzed by the modified SPLP method and that these results will guide the decision to install a groundwater monitoring well. The Work Plan states that if modified SPLP results exceed the higher of the background and IDEM groundwater quality standards, a monitoring well will be installed. This methodology assumes that the filter cake sample is representative of all past and current filter cake compositions, which may not be a reasonable assumption. In addition, if no groundwater sampling is conducted, this methodology would not comply with the requirements AO (pg. 14), which states that the Work Plan must "characterize the groundwater quality and the extent of any groundwater contamination, both vertically and horizontally, which may: exist in, around or on account of the SWMUs: and AOC identified above." The assessment of groundwater quality at each SWMU/AOC identified in the AO is clearly required. Section 5.1.1 should be revised to include the collection of representative groundwater samples from the uppermost saturated unit, collected during the advancement proposed soil boringS or through the installation of a temporary or permanent monitoring well.

Response:

Groundwater monitoring wells will be installed in the vicinity of SWMU-1 in addition to the collection of slag-fill samples. (See the Soil Sampling and Analysis and Groundwater Sampling and Analysis Work Plans.)

Volume 1, Section 5.1.2, Unit's No. 67 and No. 68, Page 2

2. The soil and groundwater methodologies proposed for Units 67 and 68 are flawed. Section 5.1.2 (pgs. 2 and 3) of the Work Plan specifies that the modified SPLP method will analyze residuals from Units 67 and 68 and that these results will guide the decision to advance a soil boring and install a groundwater monitoring well. This methodology assumes that the residual sample is representative of all past and current residual compositions, which may not be reasonable assumption. Furthermore, this approach does not comply with the AO requirement that soil and groundwater quality be characterized at each of the AO-identified SWMUs/AOC.

Response:

The proposal to use SPLP analysis has been withdrawn from the work plan.

3 Paragraph 38 (pg. 9) of the AO states that during the RCRA Facility Asgessment (RFA), IDEM observed spillage all around the Sinter Plant at Unit No. 67. However, the Work Plan (Figure 5-1) only proposes three soil borings in this area. It would appear that the proposed number of borings is insufficient to characterize potential releases to surrounding soils. ISG did not provide any rationale for the three soil sampling locations illustrated in Figure 5-1. Provide all information that is necessary to determine the adequacy of the proposed sampling.

Response:

As stated by US EPA, grid sampling is preferred by the US EPA. A grid will be placed and random nodes will be selected for drilling. Inaccessible locations selected during the random process will need to be relocated. A process for relocation is included in the Soil Sampling and Analysis Work Plan.

Volume 1, Section 5.2, Unit No. 20, Page 3

4. Section 5.2 (pg. 3) of the Work Plan states that four monitoring wells are proposed around the perimeter of the Clark Landfill. The wells will be installed in accordance with the IDEM-approved groundwater monitoring plan, at the locations presented in Figure 5-2. On page 7 of the AO, a 1997 landfill failure is documented that reportedly resulted in the movement of 11,000 to 18,000

cubic yards of landfill material to a position below the water table. The AO (pg. 7) states that the impact of the landfill failure and groundwater and water intake flume water has not been determined. It is unclear in the Work: Plan (Section 5.2) whether the design of the proposed groundwater monitoring network addresses and considers the impact of the landfill failure on the groundwater.

Response:

One of the planned monitoring wells, MW-203, is planned for a location that will penetrate the failed area. This area is not part of the intake flume, but is on the periphery of the landfill adjacent to the flume. The groundwater monitoring program for the landfill will follow the approach approved by IDEM. A copy of the groundwater monitoring plan is included in Appendix A of the Groundwater Sampling and Analysis Work Plan. No intake flume testing is proposed at this time.

Volume 1, Section 5.3.1, Unit No. 8, Page 4

5. Section 5.3.1 (pg. 4) describes sampling of lagoon basin residuals at Unit No. 8. According to the Work Plan, three transects will be completed across the unit, resulting in the collection of three composite samples collected from three borings. However, this approach does not include an assessment of underlying subsurface soils that were potentially impacted by the vertical migration of leachates from the unlined lagoon.

Response:

The borings will be advanced four feet into the underlying soils and a saturated soil sample will be collected for laboratory analysis. (See the Sediment Sampling and Analysis Work Plan).

6. The specification of composite sampling on page 4 assumes that the residuals composition is vertically homogenous, which may not necessarily be the case. Historic changes in the process or operation of the lagoon may have resulted in the deposition of a heterogenous sediment profile. To capture potential vertical changes in lagoon residual and subsurface soil quality, multiple grab samples may be necessary, depending on the thickness of units intercepted. The Work Plan should be revised to include provisions for the collection of samples at two-foot intervals starting at the top of the lagoon residual profile and extending four feet below the lagoon residuals to ensure that subsurface conditions are vertically delineated.

Response:

This lagoon was dredged on a regular basis, hence the reason for SWMU #10, Terminal Lagoon Sludge Pits. Thus, historical changes in processes at the facility will not have been immortalized in the sediments of this lagoon. The sediment work plan has been modified to clarify the method that will be used to collect the sediment samples.

7. Section 5.3.1 (pg. 4) explains that lagoon basin residuals will be collected from three borings (illustrated in Figure 5-3) and analyzed by the modified SPLP method. If modified SPLP results exceed the higher of the background and IDEM groundwater quality standards, monitoring wells may be installed in the next phase of investigation. However, according to the AO (pg. 5), there is sufficient justification to begin the process of understanding groundwater quality at this location. The AO states that the unit is active and that the 1991 National Pollutant Discharge Elimination Standards (NPDES) permit indicated that the discharge contained lead, cyanide. and phenols. It appears that seepage of discharge waters containing dissolved-phase metals and phenols to the underlying groundwater is a possibility and that groundwater sampling is justified. To assess groundwater quality in this area, and to conform to the requirements of the AO, Section 5.3.1 should be revised to include groundwater sampling in this phase of work. At a minimum, the

boring proposed for the middle of the lagoon should be used to obtain a groundwater sample from the uppermost saturated unit. Revise the Work Plan to include groundwater sampling.

Response:

The Groundwater Sampling and Analysis Work Plan has been revised to include groundwater monitoring around the terminal lagoon and its two associated SWMUs. However, due to the physical nature of the lagoon, installation of a monitoring well and/or the collection of a groundwater sample from a boring at the center of the lagoon is not feasible using standard well installation or groundwater sampling protocols.

Volume 1, Section 5.3.2, Unit No. 9, Page 5

8. The Work Plan (pg. 5) proposes the collection of surface and subsurface samples at two locations: one up-slope of the aboveground Oil Skimmer Tank and one downslope of the tank. The samples will be analyzed for the eight RCRA metals, PAHs, total cyanide, and phenol and "the results from the downgradient location will be compared to those of the upslope [sic] sample location to determine if an impact has occurred." There are two concerns with this proposed methodology. First, it is unclear why the soil screening criteria are not being proposed to evaluate whether soil impacts have occurred. Second, comparison of downslope and up-slope results does not consider the possibility for releases on the up-slope side of the tank. Although there is a higher probability for releases to have occurred at the downslope side of the tank, releases on the up-slope side are also possible. See general sampling approach.

Response:

The work plan has been modified.

Volume 1, Section 5.3.3, Unit No. 10, Page 5

9. Section 5.3.3 (pg. 5) propose to advance two soil borings, and collect two subsurface soil samples from each boring. No surface soil sampling is proposed because the former process pit was backfilled, following decommissioning. However, surface soil sampling is required to assess potential human exposure risks.

Response:

Surface sampling of the backfill materials has been included in the work plan.

10. Section 5.3.3 (pg. 6) proposes the installation of monitoring wells in the next phase of investigation, if the analytical results from subsurface samples identify potential impacts. To assess groundwater quality in this area and conform to the requirements of the AO, as discussed in General Comment 2, Section 5.3.3 should be revised to include mandatory groundwater sampling.

Response:

The work plan has been modified to include groundwater monitoring at SWMUs 8, 9, and 10.

Volume 1, Section 5.4, Unit No. 7, Page 6

11. This section of the Work Plan proposes installing four monitoring wells around the perimeter of Unit No. 7, which is located adjacent to the Indiana Harbor Ship Canal. The proposed well locations are shown in Figure 5-3, which indicates that there is a sheet pile wall that extends between the between the unit and the canal. It is assumed that the sheet pile was constructed to

prevent slope stability failures into the canal, and does not prevent groundwater flow from the unit to the canal. However, Section 5.4 does not include a proposal to install a well between Unit No, 7 and the canal. A well at this location is needed to access the potential discharge of contaminated groundwater to the canal. Section 5.4 should be revised to address this issue.

Response:

The sheet pile was not constructed to prevent slope stability failures into the Indiana Harbor Ship Canal. The sheet pile was placed prior to the making of the land that now underlies the ISG-IH facility. The making of the land mass was not completed up to the sheet pile in this area nor is there an access road along eastern side of "the Hill". Thus, this side of Unit #7 is inaccessible for monitoring well installation and repeated sampling events. Placement of a well through the open water would not survive winter weather conditions and could result in the creation of a conduit into the groundwater from the harbor surface water.

As shown on Figure 5-3, the two wells proposed (MW-401 and MW-404) on the east and west sides of Unit #7 were placed as close to the water's edge as physically possible. The intent of these locations is to evaluate potential groundwater flow toward the canal.

Volume 1, Section 5.5, Unit No. 73, Page 7

12 Section 5.5 (pg. 7) proposes to collect one subsurface sample from each of the four monitoring well locations. No surface soil sampling is proposed. However, surface soil sampling is required to assess potential human exposure risks.

Response:

Surface soil samples will be collected. The work plans have been revised.

13. There appears to be some discrepancy regarding whether the pit was backfilled following decommissioning. Clarify when the pit was backfilled.

Response:

Records regarding the pit are minimal. There are no records available for when the pit was backfilled. The pit was only a couple of feet deep (i.e., more a depression than a pit) and only about 50 feet in diameter. At some point, after the use of the pit was discontinued, the area was filled because the pit no longer exists and the area is now level land.

14. Section 5.5 (pg. 7) indicates that four groundwater monitoring wells will be installed within Unit No. 73. However, the section does not explain where the screened interval will be located.

Response:

The screened interval was not discussed in the soil plan, because all groundwater monitoring details were provided in Volume 4, the Groundwater Sampling Work Plan. The screened interval for all proposed wells was the water table, anticipated to be 6 to 12 feet below ground surface. The work plans have been revised to include a table of wells and their proposed screened intervals to aid in your review.

Volume 1, Section 5.6.1, Unit No. 23, Page 8

15. Section 5.6,1 (pg. 8) proposes the installation of monitoring wells in the next phase of investigation if analytical results from subsurface samples indicate potential impacts.

Response:

Monitoring wells are proposed at each SWMU or group of SWMUs.

Volume 1, Section 5.6.2, Unit No. 24, Page 9

16. Section 5.6.2 (pg. 9) specifies the lagoon residuals sampling methodology for Unit No. 24. According to the Work Plan, three transects will be completed across the unit, resulting in the collection of seven composite samples collected from seven borings. However, this approach does not include an assessment of underlying subsurface soils nor horizontal transport of dissolved COC that were potentially impacted by the vertical migration of leachates from the unlined lagoon. The Work Plan should be revised to specify that the borings will be advanced through the entire sediment profile and will continue into the underlying material, which may include the peninsula slag fill or other anthropogenic material.

Response:

The work plan has been revised to specify that the borings will be advanced through the entire sediment/residual profile and into the underlying material. In conformance to the comments for Unit No 8, ISG-IH proposes to advance the borings four feet into the underlying material and to collect one saturated soil sample at each of the proposed sampling locations.

17. The specification of composite sampling on page 9 and subsequent analysis for VOCs is not acceptable due to concerns regarding the loss of volatile compounds during the compositing procedure. In addition, composite sampling assumes that the sediment composition is vertically homogenous, which may not be the case. Historic changes in the process or operation of the lagoon may have resulted in the deposition of a heterogenous sediment profile. To capture potential vertical changes in lagoon residual and subsurface soil quality, multiple grab samples may be necessary, depending on the thickness of units intercepted. The Work Plan should be revised to include provisions for the collection of samples at 2-foot intervals starting at the top of the lagoon residual profile and extending 4 feet below the lagoon residuals to ensure that subsurface conditions are vertically delineated. In addition, no sampies should be composited for VOC analysis.

Response:

The work plan has been revised as noted under Comment 6.

Volume 1, Section 5.6.2, Unit No. 24, Page 10

18. Section 5.6.2 (pg. 10) proposes the installation of monitoring wells in the next phase of investigation if modified SPLP analytical results of sediment samples indicate potential impacts. To assess groundwater conditions in this area, and to conform to the requirements of the AO as dscribed in General Comment No. 2, Section 5.6.2 should be revised to include groundwater sampling in this phase of work.

Response:

The work plan has been revised to add groundwater sampling around the lagoon.

Volume 1, Section 5.6.3, Unit No. 26, Page 10

19. Section 5.6.3 (pg. 10) proposes to advance two soil borings, and collect two subsurface soil samples from each boring. No surface soil sampling is proposed because the former process pit was backfilled with slag following decommissioning. However, surface soil sampling is required to assess potential human exposure risks.

Response:

Surface sampling has been added to the work plan.

20. Section 5.6.3 proposes additional samples or the installation of monitoring wells in the next phase of investigation if analytical results from subsurface samples indicate potential impacts. To assess groundwater conditions in this area, and to conform to the requirements of the AO, Section 5.6.3 should be revised to include groundwater sampling.

Response:

The work plan has been revised to include the installation of monitoring wells and the sampling of groundwater.

Volume 1, Section 5.7, Group G, Unit No. 47, Page 11

21 Section 5.7 (pg. 11) proposes the installation of monitoring wells in the next phase of investigation if analytical results from surface and subsurface samples indicate potential impacts. To assess groundwater conditions, and to conform to the requirements of the AO, Section 5.7 should be revised to include groundwater sampling.

Response:

The work plan has been revised to include the installation of monitoring wells and the sampling of groundwater.

Volume 1, Section 5.8, Group H, Unit No. 65, Page 11

22. According to page 11, Section 5.7, five groundwater monitoring wells will be installed within Unit No. 47. However, the section does not explain where the screened interval will be located. Section 5.8 should be revised to address this issue.

Response:

The groundwater monitoring program for all SWMUs was provided in Volume 4, the groundwater sampling work plan. These had been discussed in Volume 1 Section 5 to show where the soil samples would be collected. A table of screened intervals has been included to aid in your review.

Volume 1, Section 5.8, Group H, Unit No. 65, Page 12

23. The specification of composite sampling on page 12 and subsequent analysis for VOCs is not acceptable due to concerns regarding the loss of volatile compounds during the compositing procedure. The Work Plan should be revised to address this issue.

Response:

The word composite does not appear on page 12, nor was composite sampling proposed for media for Group H, SMWU 65 and the AOC. No revision to the work plan is required.to address this issue.

Volume 1, Section 6.1, Soil Sample Locations, Page 1

24. The information included in the Work Plan is insufficient to determine whether the background sample locations chosen are appropriate. The Work Plan should include additional discussion regarding the reasons for their selection and justification that site-related contamination is unlikely to be present at the chosen locations. ISG should consult EPA (2001a, 2002a) for guidance on background sampling.

Response:

The chosen locations for background "slag" sampling were not based on the US EPA guidance for "background" sampling of a similar soil material outside the area of potential impact. ISG is not sited on "soil", but is sited on "made land" composed of anthropogenic material referred to throughout the work plans as slag-fill. The "made land" was filled into Lake Michigan over several major time intervals. These time intervals are illustrated on Figure 3-14. "Made land" does not exist outside the facility. The background locations depicted on Figure 4-1 were selected to the best of ISG's knowledge in areas that should not be affected by site operations.

The Soil Sampling and Analysis Work Plan has been revised to include additional discussion on the chosen background sampling locations.

Volume 1, Section 6.2, Soil Sampling Procedures, Page 1

25. The Work Plan does not specify the depth at which the surface soil samples will be collected. ISG should revise the Work Plan to indicate the depths of proposed surface soil samples. Note that the top six to twelve inches of depth are generally considered to be the most relevant depth interval for assessing risks to ecological receptors. Section 7 should also be revised to clearly indicate the depth interval(s) for data that will be used in the ecological risk assessment.

Response:

The depth of the samples was specified under Section 6.0, surface samples would be collected from between zero and two feet below ground surface and subsurface samples would be collected from a depth below two feet below ground surface. The work plan has been revised with Table 5-1 to identify the depths the samples will be collected.

Volume 1, Section 7.1, Overview, Page 1

26. The Work Plan has omitted *Ecological Risk Assessment Guidance for Superfund* (U.S. EPA 1997) from its list of guidance documents to be used in developing the risk evaluation approach. This is a critical ecological risk guidance document and should be utilized. ISG should also use Eco-Update bulletins (e.g., EPA 2001b, 2001c), as appropriate.

Response:

The revised Work Plan will site the references, notes in this comment and the Ecological Risk Assessment will follow these guidelines.

Volume 1; Section 7.2.1, Data Assembly, Page 3

27. The Work Plan indicates that if hot spots (i.e., analyte concentration greater than the mean plus two standard deviations for the data set) are found, the concentration(s) will be compared to the EPA Region 6 CAS high-priority BLTs. If the concentration(s) exceed the CAS high-priority BLT values, then voluntary interim remediation activities will be considered. If voluntary interim remediation activities are implemented, then hot spot data will be removed from the data set and confirmation sampling data will be added. This is not an acceptable approach for two reasons: 1) the high-priority BLT were developed to prioritize sites under the EPA Region 6 CAS, not to represent action levels or cleanup levels; 2.) conducting remedial activities, removing hot spot data, and adding confirmation sampling data to the original group data set(s) introduces bias (i.e. the incorporation of sampling data in areas where no contamination is expected). If ISG elects to conduct voluntary interim remediation activities, it is recommended that ISG develop appropriate action/cleanup levels and that all data for the remediated area(s) be excluded from the original group data set(s).

Response:

ISG-IH and Tecumseh is removing from consideration the use of the CAS approach. The work plans have been revised to provide a data evaluation discussion.

Volume 1, Section 7.2.2, Data Usability Analysis, Page 6-7

28. The Work Plan indicates that laboratory detection limits will be evaluated against the EPA Region 9 Industrial Preliminary Remediation Goals (PRGS) for human health and Region 5 Eco-Risk Screening Values for ecological risk. However, it is recommended that the laboratory detections limits be compared against the criteria that will be used for human health risk screening analysis (i.e., IDEM Soil Closure Levels or Critical Values [CVs]) in order to determine the adequacy of the analytical method and quantitation limits. See also Specific Comment 37 regarding ecological screening levels.

Response:

The work plan has been revised to show the IDEM soil closure levels or Critical Values using the IDEM RISC guidance. US EPA Region V Ecological screening values will also be included as screening criteria. It is understood that some laboratory analyses cannot meet the very low screening criteria that has established either for ecological or human health or both. The laboratory selected by ISG and Tecumseh will make every effort to achieve the lowest detection level possible for each matrix analyzed.

29. It is not appropriate to add confirmation sampling data to the original group data set(s) because it introduces bias. If voluntary interim remediation activities are implemented, all data for the remediated area(s) should be excluded from the original group data set(s).

Response:

Comment noted.

preliminary remediation criteria or develop site-specific risk-based cleanup goals, it seems unnecessary for ISG to screen exposure point concentration against the EPA Region 6 high-priority and low-priority CAS BLTs. The sampling plan should be revised to further justify the use of CAS BLTs or use only IDEM criteria,

Response:

ISG-IH and Tecumseh are withdrawing the proposal to use the CAS approach. The work plans have been revised.

Volume L Section 7.2.4.2, Ecological Risk Screening, Page 15-16

34. ISG proposes using the EPA Region 6 CAS Ecological Exclusion Criteria Worksheet and Ecological Assessment Checklist to identify incomplete or insignificant exposure pathways that exist at a Group, While this procedure is generally acceptable, ISG should understand that proper documentation of answers to worksheet questions is critical. For example, if the terrestrial wildlife pathway at a Group is determined to be incomplete because the Group's area is wholly contained within contiguous land characterized by pavement and buildings, then ISG should provide photos documenting this fact. The completed Ecological Exclusion Criteria Worksheet Ecological Assessment Checklist, and conceptual site models that clearly describe ecological habitat(s), ecological exposure pathways, and receptors must be submitted to EPA for approval prior to conducting the quantitative edological screen. Note that the information presented in Tables 7-2B through 7-9B does not constitute a complete conceptual site model; see EPA (1997) for more appropriate examples of conceptual site models. Additionally, ISG should also include lists of species observed or expected to be present at any ecological habitats that may exist on site if practicable.

Response:

ISG-IH and Tecumseh are withdrawing the proposal to use the CAS approach. The work plans have been revised.

35. ISG should clarify how exposure point concentrations will be calculated or comparison to ecological screening levels. Note that EPA guidance (1997) specifies that, "the highest measured or estimated on-site contaminant concentration for each environmental medium should be used to... ensure that potential ecological threats are not missed."

Response:

The work plans have been revised.

Volume 1, Section 7.2.4.3, Risk Evaluation Report, Page 16

36. ISG notes that each Group will be placed into one of two ecological priority categories: Needs Further Evaluation or No Current Federal Concern (NCFC) Site. ISG should describe the criteria that will be used to categorize the Groups.

Response:

The work plans have been revised.

Volume 1, Section 7.2.5, Tiered Risk Screening Analysis, Page 17

37. ISG specifies that Group-specific data will be compared to EPA Region 5 eco-risk screening criteria. While the Region 5 ecological screening levels (ESLs) are a good resource, it is often necessary to use additional sources for chemicals for which there is no Region 5 ESL. ISG should use a hierarchy of sources of ecological screening levels, and revise the Work Plan to include a table of the specific screening values that will be used. Some additional sources of soil screening levels are Efroymson et al. (1997a,b) and EPA (2000b).

Response:

A variety of resources will be consulted with respect to ecological screening levels including those listed in this comment. These citations will be reviewed during preparation of the Work Plan reports.

38. ISG indicates that the third stop of the tiered risk-based analysis will be to compare Group-specific data to "operational area-specific screening criteria." It is unclear what is meant by "operational area-specific screening criteria." Clarify the term.

Response:

The work plans have been revised, the term "operational area-specific screening criteria" is no longer used in the work plans.

Volume 1 Section 7.2.5.2, Human Health Risk Screen, Page 18

39. Currently, Section 7.2.5.2 provides insufficient detail regarding the proposed Tier 2 screening process to evaluate its appropriateness. Thus, ISG should provide additional information regarding the proposed Tier 2 screening and critical value (CV) derivation process. Specifically, ISG should present the methodology and the Group-specific receptor exposure values that will be incorporated in lieu of default values.

Response:

The Tier 2 screening process has been omitted from the revised Work Plan given this Work Plan will use focused site contaminant investigation and risk screening only. Once the screening analysis has been completed and the results tabulated a Risk Evaluation Report will be prepared that will present the procedures that will be followed.

Volume 1, Section 7.2.5.3 Ecological Risk, Page 19

40. The methodology that will be used, for screening chemicals not detected should be clarified in this section. The maximum detection limits for chemicals not detected should be compared to ecological screening criteria. Those chemicals with maximum detection limits greater than screening criteria should be retained as COPCs (see Specific Comment 28, above).

Response:

The work plans have been revised.

41. Because ISG proposes to potentially categorize some Groups as NCFC areas on the basis of the tier 1 risk screening, ISG must ensure that the screening procedure will be protective of receptors identified in each Group. Of particular concern are potential risks to wildlife from bioaccumulative chemicals, which media-specific screening levels frequently do not consider. Although most of

the Region 5 soil ESLs were based on exposure to the masked shrew, it is not clear whether these levels will be protective of other upper trophic level receptors such as birds. ISG must revise the Soil Work Plan to clearly state how bioaccumulative chemicals will be identified and screened. ISG should understand that upper trophic level organisms are the receptors of interest for bioaccumulative constituents and the screening methodology should be protective of these receptors. It should also be noted that screening values for wildlife in higher trophic levels are available for some constituents (e.g., EPA 2000b, Efroymson et al. 1997c).

Response:

If bioaccumulative contaminants are detected at the site, the ecological risk screening values for those compounds will be examined to determine which trophic level species they have been designed to protect. If higher trophic level species may be potentially present at this site, then a Food Chain Multiplier (FCM) value will be used to adjust the screening criteria accordingly. FCM values can the focused in US EPA (1999) Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities.

Volume 1, Section 7.2.6, Operational Area-Specific Risk Assessment, Page 20

42. ISG proposes the use of an operational area-specific risk assessment, as outlined in the EPA Region 6 CAS, to represent a final documentation of the potential human health risks from releases. However, ISG does not provide sufficient justification to evaluate if the operational area-specific approach is appropriate. If ISG elects to take this approach, the methodology and assumptions to be employed should be provided prior to conducting a site-specific risk assessment or developing site-specific cleanup goals.

Response:

ISG-IH are Tecumseh are withdrawing the proposal to use the CAS approach. The work plans have been revised.

Sediment Sampling and Analysis Plan (Volume 2)

Volume 2, Section 5.0, Sample Locations and Rationale for the Groups, Page 1

43. It appears that the work described in Volume 2, Section 5, relating to sediment sampling at SWMUs 8 and 24 is a duplication of the work described in Volume 1 relating to soil sampling. Refer to Specific Comments relating to SWMU 8 and SWMU 24.

Response:

Sediment sampling components were included In both the soil and sediment work plans deliberately.

44. If ecological exposure pathways are complete in SWMU 8 and SWMU 24, ISG should consider including acid volatile sulfide (AVS), simultaneously extracted metals (SEM), total organic carbon (TOC), and grain size in the suite of analyses to be conducted on sediment samples. These are important methods for more accurately quantifying the bioavailability and toxicity of many constituents in sediments to ecological receptors. Although conservative assumptions regarding bioavailability are sufficient for a tier 1 ecological screen, if risks do exist, SEM, AVS, and TOC measurements may be necessary to complete a more detailed ecological risk assessment. It is best for these measurements to correlate temporally with the other chemical analyses, because sediment conditions can change over time.

Response:

Comment noted. Acid volatile sulfide (AVS) and simultaneously extracted metals (SEM) are methods used exclusively to evaluate if "free metals" are available to biota and water in contact with the sediments. These are strictly part of an ecological risk assessment for sediments. The sediments we are sampling are associated with wastewater lagoons. These analytical methods may be selected, during future sampling events (if any), if warranted.

Volume 2, Section 6.2, Sediment/Residual Sampling Procedures, Page 1

45. The Work Plan does not specify the depth at which the sediment samples will be collected. ISG should revise the Work Plan to indicate the depths of proposed sediment samples. Note that the top 6 inches of depth are generally considered to be the most relevant depth interval for assessing risks to ecological receptors. Volume 2, Section 7, should also be revised to clearly indicate the depth interval(s) for data that will be used in the ecological risk assessment.

Response:

As stated above in comment # 6 and # 16, the work plan has been revised to indicate how the sediment samples will be selected and analyzed.

Volume 2, Section 7.2.1, Data Assembly, Page 3

46. The Work Plan indicates that if hot spots (i.e., analyte concentration greater than the mean plus two standard deviations for the data set) are found, then voluntary interim remediation activities will be considered. If voluntary interim remediation activities are implemented, hot spot data will be removed from the data set and confirmation sampling data will be added. However, because removing hot spot data and adding post remediation confirmation sampling data to the original group data set(s) introduces bias it is not appropriate. If ISG elects to conduct voluntary interim remediation activities for sediment, it is recommended that ISG develop appropriate action/cleanup levels and that all data for the remediated area(s) be excluded from the original group data set(s).

Response:

No CAS approach is proposed, thus no interim remedial activities can be evaluated. The work plans have been be revised to address this concern.

Volume 2, Section 7.2.2, Data Usability Analysis, Page 6

47. See Specific Comment 28.

Response:

See response to Specific Comment 28.

Volume 2, Section 7.2.3.1, Pre-analysis Database Assembly, Page 8

48. See Specific Comment 30.

Response:

See response to Specific Comment 30.

49. See Specific Comment 31.

Response:

See response to Specific Comment 31.

Volume 2, Section 7.2.3.2, Statistical Analysis, Page 9-11

50. See Specific Comment 32.

Response:

See response to Specific Comment 32.

Volume 2, Section 7.2.4.1, Background Comparison, Page 11

51. The information included in the Work Plan is insufficient to determine whether the background comparison is appropriate. Table 5-1 indicates that collection of background sediment samples is not planned. The Work Plan should include additional discussion regarding the rationale for comparing sediment concentrations to background fill (slag) concentrations. ISG should consult EPA (2001a, 2002a) background guidance.

Response:

Comment noted.

Volume 2, Section 7.2.4.2, Human Health Risk Screen, Page 13

52. See Specific Comment 39.

Response:

See reponse to Specific Comment 39.

Volume 2, Section 7.2.4.3, Ecological Risk, Page 13-14

53. See Specific Comment 34.

Response:

See response to Specific Comment 34.

54. See Specific Comment 35.

Response:

See response to Specific Comment 35.

55. See Specific Comment 40.

Response:

See response to Specific Comment 40.

56. Because ISG proposes to potentially categorize some Groups as NCFC areas on the basis of the Tier 1 risk screening. ISG must ensure that the screening procedure will be protective of receptors identified in each Group. Of particular concern are potential risks to wildlife from bioaccumulative chemicals, which media-specific screening levels often do not consider. For example, the Region 5 ESL document states that the sediment ESL for lead does not consider bioaccumulation nor biomagnification. ISG must revise the Work Plan to clearly state how bioaccumulative chemicals will be identified and screened. ISG should understand that upper trophic level organisms are the receptors of interest for bioaccumulative constituents and the screening methodology should be protective of these receptors. It should also be noted that screening values for wildlife in higher trophic levels are available for some constituents (e.g., Efroymson et al. 1997c).

Response:

The proposal for NCFC areas was related to using the US EPA Region VI CAS. ISG-IH and Tecumseh are withdrawing the proposal to use the CAS approach. The work plans have been revised.

57. ISG specifies that Group-specific data will be compared to EPA Region 5 eco-risk screening criteria. While the Region 5 ESLs are a good resource, it is often necessary to use additional sources for chemicals for which there is no Region 5 ESL. ISG should use a hierarchy of sources of ecological screening levels, and revise the Work Plan to include a table of the specific screening values that will be used. Some additional sources of sediment screening levels are MacDonald et al. (2000), Smith et al. (1996), Persaud et al. (1993), and Long and Morgan (1991).

Response:

A variety of resources will be consulted with respect to ecological screening levels including those listed in this comment. These citations will be listed in the revised work plan.

Volume 2, Section 7.2.4.4, Risk Screening Report, Page 14

58. See Specific Comment 36.

Response:

See response to Specific Comment 36.

Hydrogeologic Conditions Work Plan (Volume 3)

Volume 3, Section 4.1.5, Developing a Decision Rule, Page 3

59. Page 3, Section 4.1.5 reads "the decision rule and its inputs are provided in detailed discussions in Section 7.0." However, Section 7.0, Reporting, contains proposed reporting deliverables. It appears that the referenced section is missing or has been cited incorrectly. Clarify the discrepancy.

Response:

The citation is incorrect and the proper citation has been inserted in this section.

Groundwater Sampling and Analysis Plan (Volume 4)

Volume 4, Section 5.0, Sample Locations and Rationale for the Groups, Page 1

60. ISG should consider including hardness and alkalinity in the suite of analyses to be conducted on water samples. These parameters are important in more accurately quantifying the bioavailability and toxicity of many constituents to ecological receptors. Although conservative assumptions regarding bioavailability are sufficient for a tier 1 ecological screen, if risks do exist, then these measurements may be necessary to complete a more detailed ecological risk assessment. It is best for these measurements to correlate temporally with the other chemical analyses, because conditions can change over time.

Response:

Hardness and alkalinity (carbaonate and bicarbonate) will be added to the suite of groundwater analyses.

Volume 4, Section 6.1, Groundwater Sample Locations, Page 1

61. Section 6.1 references Table 6.1, Planned Well Locations and Well Details By Group, and Figure 6-1, Background Soil Boring and Monitoring Well Locations. However, Table 6.1 and Figure 6-1 are inconsistent. Table 6.1 indicates that there are three proposed background monitoring wells, but Figure 6-1 illustrates only one proposed background monitoring well. Clarify the discrepancy.

Response:

Three background monitoring wells will be located within the one (same) background slag area. Due to the scale of the drawing, one monitoring well symbol was used to depict the background slag area that would include groundwater monitoring. (Similarly, multiple soil borings that were proposed per slag-fill background area were represented by a single symbol). The work plan drawings have been revised.

Volume 4, Section 7.2.1, Data Assembly, Page 3

62. For groundwater, it is not appropriate to compare analyte concentrations to groundwater impacted by slag fill because the concentrations would not represent background. Background groundwater water samples should be collected from wells that have not been impacted by site-related activities including any impacts from slag.

Response:

ISG-IH and Tecumseh disagree with this statement. The peninsula is composed nearly entirely of slag-fill materials. The background groundwater quality, even without industrial activities would be what ever it will be within the slag. Comparison to on-site groundwater in areas unaffected by the SWMUs is the first step in evaluating groundwater quality on the peninsula.

However, in the interest of compromise, the work plan has been revised.

Volume 4, Section 7.2.2, Data Usability Analysis, Page 5

63. See Specific Comment 28.

Response:

See response to Specific Comment 28.

Volume 4, Section 7.2.3.1, Pre-Analysis Database Assembly, Page 7-8

64. See Specific Comment 30.

Response:

See response to Specific Comment 30.

65. See Specific Comment 31.

Response:

See response to Specific Comment 31.

Volume 4, Section 7.2.3.2, Statistical Analysis, Page 8

66. See Specific Comment 32.

Response:

See response to Specific Comment 32.

Volume 4, Section 7.2.4.1, Human Health Risk, Page 10

67. Although there are no current health receptors, nor are there presently any groundwater use restrictions at, or surrounding, the site. Thus, future human receptors could be exposed to potentially contaminated groundwater. To evaluate whether groundwater is a medium of concern for future human receptors, the concentrations in groundwater should be compared against screening criteria (e.g. Maximum Contaminant Levels [MCLs] or EPA Region 9 PRGs for tap water). If groundwater concentrations exceed these criteria, additional delineation may be necessary and, subsequently, a groundwater use restriction may be warranted. If VOCs are detected in groundwater, ISG should evaluate the risk via air (indoor and outdoor) and, thus, applicable screening criteria should be discussed in this section.

Response:

The work plans have been revised.

Volume 4, Section 7.2.4.2, Ecological Risk Screening, Page 11

68. ISG-IH proposes using the EPA Region 6 CAS Ecological Exclusion Criteria Worksheet and Ecological Assessment Checklist to identify incomplete or insignificant exposure pathways that exist at a Group. Note that, in order to exclude a Group's groundwater from ecological evaluation, ISG must clearly delineate all surface water bodies (both inside and outside the facility boundaries) where groundwater interaction could be occurring, and evaluate the ecological habitat provided by each of these surface waters. If there is any potential for groundwater interaction with surface water that provides ecological habitat, then groundwater must be included in the ecological screen. Additionally, in such cases, surface water habitat and receptors should be included in the conceptual site model. See also Specific Comment 34 above.

Response:

ISG-IH and Tecumseh are withdrawing the proposal to use the CAS approach. The work plans have been revised.

Volume 4, Section 7.2.4.3, Risk Evaluation Report, Page 11

69. ISG should also include conceptual site models that clearly describe ecological pathways and receptors in the Risk Evaluation Report. This information will assist in making decisions on appropriate analyses to be included in the quantitative ecological risk screening.

Response:

As discussed in our response to comment #39, a Risk Evaluation Report will be proposed. This report will include summaries of the site analytical results, site conceptual models, risk screening (both human health and ecological) and a proposed Tier 2 methodology.

Volume 4 Section 7.2.5.1, Background Comparison, Page 11

70. The information included in the Work Plan is insufficient to determine whether the background data that will be used are appropriate. The Work Plan should provide additional information on the groundwater data set(s). ISG should consult EPA (2001a, 2002a) background guidance.

Response:

Comment noted.

Volume 4, Section 7.2.5.2, Ecologic& Risk Screening, Page 13-14

71. Section 7.2.5.2 and Section 7.2.4.2 are both headed "Ecological Risk Screening," which causes the reader confusion. It appears that Section 7.2.4.2 describes the qualitative ecological screening, and Section 7.2.5.2 describes the quantitative ecological screening. These section headers should re-written to add clarity. The ecological screening criteria cited is also outdated. The current (August 2003) criteria can be found at http://www.epa.gov/reg5rcra/ca/edql.htm.

Response:

Comment noted.

72. ISG specifies that the 95% UCL or the maximum detected concentration, whichever is lower, in each Group will be compared to ecological screening levels. In a screening-level ecological risk assessment, it is more appropriate to use the higher of the 95% UCL or the maximum detected concentration. Note that EPA guidance (1997) specifies that, "the highest measured or estimated on-site contaminant concentration for each environmental medium should be used to... ensure that potential ecological threats are not missed."

Response:

Comment noted.

73. See Specific Comment 40.

Response:

See response to Specific Comment 40.

74. See Specific Comment 56.

Response:

See response to Specific Comment 56.

75. ISG specifies that Group-specific data will be compared to EPA Region 5 eco-risk screening criteria. While the Region 5 ESLs are a good resource, it is often necessary to use additional sources for chemicals for which there is no Region 5 ESL. Additionally, it is important that ISG ensure that the ecological screening levels used for groundwater are less than or equal to any applicable Indiana Water Quality Standards. ISG should use a hierarchy of sources of ecological screening levels, and revise the Work Plan to include a table of the specific screening values that will be used. Some additional sources of water screening levels are EPA (2002b), Suter and Tsao (1996), and EPA (1992)

Response:

Comment noted.

76. It is unclear whether ISG plans to submit a report summarizing the results of the quantitative ecological risk screening before preparing the operational area-specific risk assessment. It is important that the results of the screen be submitted to EPA, and agreement reached on which areas require further assessment before proceeding with the more detailed risk assessment. ISG should consult EPA (1997) guidance for a description of the ecological risk assessment process (both screening and baseline assessments). As outlined in this guidance document, a scientific and management decision endpoint is required at the conclusion of the screening level ecological risk assessment. ISG should revise the Work Plan to describe a process that conforms to EPA (1997) guidance.

Response:

See comment responses #39 and #69.

Volume 4, Section 7.2.6, Operational Area-Specific Risk Assessment, Page 14

77. Insufficient detail is provided in this section to determine the appropriateness of the approach. If ISG elects to conduct an operational area-specific risk assessment for groundwater, it is recommended that ISG submit a Work Plan outlining the methodology and assumptions for this risk assessment.

Response:

ISG-IH and Tecumseh are withdrawing the proposal to use the CAS approach. The work plans have been revised.

Quality Assurance Project Plan (Volume 5)

Volume 5, Section 1.1.3, The Project Proposal, Proposal Objectives, and Decision Statements, Page 3

78. Section 1.1.3, page 4, of the QAPP states that "this QAPP has been prepared to ensure consistency in approach, implementation, and quality assurance/quality control (QA/QC) for the four Work Plans. The specific Work Plans incorporate this QAPP by reference, thereby streamlining the submittal and review process." However this same section of the QAPP states that, "the Decision Statement for the Units and AOC investigations to be conducted as required

by the Administrative Order are based on a tiered risk-based approach discussed in Section 7 of the soil, sediment and groundwater sampling and analysis Work Plans." The QAPP goes on to states that, "the application of the tiered risk-based approach to analytical data to be acquired for the investigations is in Section 7.0 of the soil, sediment and groundwater sampling and analysis Work Plans." It is understood that the QAPP is intended to cover several sampling events to be performed at the ISG site; however, the QAPP must be revised to provide more detail, such as an outline of the specific usages or all data to be obtained. Ensure that each "Work Plan" will be submitted for review and approval prior to initiation of sampling and analysis tasks. It is recommended that this section of the QAPP be expanded to include more detail as required by the *RCRA QAPP Instructions, U.S EPA Region 5 and EPA QA/R-5*. Specifically, indicate in the QAPP that the overall project objectives will be included in the Work Plans. This outline should include a discussion of the specific usability for all data to be obtained including any data generated from field screening and/or field measurements. The intended data usages, including any pertinent decision rules, should be presented in a tabular format.

Response:

ISG-IH and Tecumseh are withdrawing the proposal to use the CAS approach. The QAPP has been revised.

Revise the QAPP to state that each specific Work Plan will present a strategy for accomplishing the overall objectives. This strategy must be expressed in terms of specific field and laboratory measurements that will be performed. The strategy must define an analytical scheme that is conceptually consistent with the overall objectives and decision statements. As required by the *RCRA QAPP Instructions, U.S.EPA Region 5*, ensure that the specific objectives are expressed quantitatively. In order to adequately express the specific project objectives, the following information should be tabulated in the QAPP or in the Work Plans:

- Summary statistics (e.g.. mean, maximum, range), which specify the form the data will be in when compared to action levels or standards expressed in decision rules
- Acceptable level of confidence in the data needed for the sampling purposes, or the acceptable amount of uncertainty.

Response:

The QAPP has been revised.

As required by the *RCRA QAPP Instructions, U.S.EPA Region 5*, the QAPP must provide a discussion of the consideration of human-health risk-related issues which may impact field activities. Such issues that should be considered may be: land use planning and assumptions, selection of detection limits/reporting limits, risk-based screening options, background sampling, and data quality for assessing human health risk. If such information is to be included in the Work Plans, ensure that it is complete and includes the information outlined above.

Response:

Comment noted.

Volume 5, Section 1.4.3, Laboratory Analyses, Page 33

79. The second paragraph on page 34 of this section states that "Tables 1-1 through 1-4 also present the risk-based Data Quality Levels (DQLs) (human health and ecological) established for the work at this site." However, Tables 1-1 through 1-4 only present the "RISC Res," which are the

residential limits. Clarify and revise the QAPP provide the specific ecological risk-based DQLs for each parameter. Ensure that the ecological data quality levels (EDQLs) developed by Region 5 are used since these EDQLs represent the most conservative criteria.

Response:

The tables have been revised.

The last paragraph of Section 1.4.3 of the QAPP states that, "parameters, for which the required DQLs/EDQLs cannot be detected using a prescribed analytical method cited in this QAPP will be identified. Based on current laboratory MDLs available, parameters for which the required DQLs/EDQLs cannot be achieved by available analytical methods, as indicated by the laboratory are highlighted (in the tables)." Clarify how such analyses will be evaluated in a risk assessment. Clarify if alternative methods can be proposed to achieve the required DQLs/EDQLs.

Response:

Comment noted.

Additionally, indicate whether the facility will perform an ecological risk assessment, as required by *RCRA QAPP Instructions, U.S.EPA Region 5* and, if so, provide an outline of the risk assessments.

Response:

The QAPP has been revised.

The text in this section of the QAPP states that, "the laboratory MDLs and Reporting Limits (RLs) are all presented in Tables 1-1 through 1-4." However, these associated tables indicate the practical quantitation limits (PQLs) associated with each parameter of interest. In general, PQLs and RLs are synonymous. However, as per definition, the MDL is a measure

Response:

This comment is incomplete. ISG-IH and Tecumseh assume that US EPA desires to see both the PQL and the MDL. The tables have been revised to show both.

Section 1.4.3 also states, that, "MDLs presented in this QAPP are subject to change as they are updated periodically by the laboratory." Ensure that such changes in the MDL still allow for achievable project DQLs and that such modifications are approved prior to implementation.

Response:

A statement to this effect will be made in the QAPP.

Section 1.5.7 of the QAPP indicates that subsurface samples from Unit #26 will be analyzed for "cresol." Neither Section 1.4.3 nor any of the associated tables identify cresol as an analyte of interest. Clarify and provide the associated, method, MDL, DQL and EDQL for the analysis.

Response:

The analytes have been changed to conform to the US EPA-required analyte list. As such, the tables have been modified appropriately.

Volume 5, Section 1.5.1, Rationale of Selected Sampling Locations, Page 35

80. Section 3.4.2 of the QAPP states that, "the rationale for the proposed sampling at the Groups will be discussed in the applicable Work Plan." As required by the *RCRA QAPP Instructions, U.S. EPA Region 5*, the project description of the QAPP must be revised to ensure that each Group Work Plan includes the following information:

- A list of all environmental measurements to be performed, supported by appropriate rationale
- A tabulated description and itemization of all specific tasks to be performed in the generation of field and laboratory data, linked to every specific objective and decision rule defined for the project
- A summary table listing, for each sampling location, the total numbers of samples (including investigative, quality control (QC), split and reserve), sample type or matrix, and all measurements to be performed, differentiate where applicable to critical measurement from the noncritical measurements. Critical measurements are those specifically emphasized in project decision rules. Noncritical measurements are those to be performed in conjunction with the reporting of identified critical measurements

Response:

Summary tables have been added to the work plans to aid in your review.

Several subsections of this section of the QAPP references using, "a modified SPLP extraction" for several of the metals. This is the first reference to performing an SPLP extraction. Revise the QAPP to provide the method to be used for the procedure as well as all detection limits and holding times associated with the method. Additionally, the QAPP goes on to states that, "the metals analysis results from the SPLP will be compared to the higher of the IDEM groundwater quality standards or site-specific background data for groundwater." Because this data will be used to determine whether a monitoring well is to be installed, it is critical that the QAPP be revised to provide these groundwater or background data to perform this comparison. Ensure that the QAPP is comprehensive and provides all of the necessary information for the field and laboratory personnel to execute the required activities to fulfill the outlined DQOs.

Response:

ISG-IH is withdrawing the inclusion of the SPLP testing.

Throughout Section 1.5 of the QAPP, the text continually references the "eight RCRA metals" to be analyzed for. However, from the information provided in Table 1-3, additional metals have also clearly been identified for analysis for both solid and aqueous matrices. Clarify whether, the metals such as thallium, in addition to the eight RCRA metals will also be analyzed for. If not, modify the tables to reflect only the parameters of interest for the sampling events. Alternatively, if additional metals are to be analyzed for, clearly indicate which SWMUs/AOCs will be sampled and analyzed for these compounds.

Response:

The QAPP has been modified to include the list of analytes proscribed by this letter. We have made the following assumptions reqarding the analyte list:

1. *The first VOC, is spelled Acroleoin, we have assumed that this is really Acrolein*
2. *One of the listed analytes has not been identified on any of the regulatory lists. The compound is listed as p-Chloro-n-cresol, we are assuming the "n" should be an "m".*
3. *1,2-dichlorobenzene was listed twice and have assument that the second listing is 1,3-dichlorobenzene.*

Volume 5, Section 3.0, Quality Objectives and Criteria for Measurement Data, Page 1

81. It is understood that the QAPP is intended to be generic and more specific Work Plans for investigative activities will be developed for each sampling event. However, as per the *RCRA QAPP Instructions U.S.EPA Region 5* and *EPA QA/R-5*, the QAPP must be revised to ensure that these Work Plans will include discussions to describe project-specific objectives in terms of field data comparability.

Response:

The work plans have been revised.

This section of the QAPP discusses the laboratory and field QC objectives' accuracy and precision. However, the specific QC limits for these QC parameters have only been provided for field precision. The text references "Section 26.0 of the SIMALABS QAP;" however, Section 26 pf the SIMALABS QAP does not provide this information for all of the parameters of interest. Revise the QAPP to provide a table with each of the specific QC limits for both field and laboratory measurements for each of the QC objectives identified.

Response:

The QAPP has been revised.

Volume 5, Section 4.8, Sampling Container, Page 6

82. The QAPP states that, "the laboratory will supply all sample containers and preservatives." Ensure that this also includes EnCore samples. Ensure that all sample containers are "contaminant-free" and provide the procedures for obtaining "contaminant-free" containers.

Response:

According to Simalabs QAP, Section 12.4, page 38, "Most containers are purchased certified clean from a commercial vendor. ... Containers that are purchased without certification must be verified clean prior to shipment to clients in accordance with the bottle QC SOP."

A statement regarding the use of only "contaminant-free" containers has been added to the QAPP.

Volume 5, Section 5.1, Field Custody Procedures, Page 1

83. As required by *RCRA QAPP Instructions, U.S. EPA Region 5*, revise the QAPP to indicate whether sample tags are attached to each sample container. While sample labels may be used in addition to tags, sample tags must always be used. The sample tag is the only physical evidence of the sample aliquot as carried through the entire custody process. Sample tags also

allow for disposal of sample containers once the samples have exceeded their holding times. A sample tag is attached to each individual sample aliquot for each investigative or QC sample. At a minimum, a sample tag will include the field sample number, location, date/time of collection and type of analysis, and a space for the laboratory sample number. A sample tag may be attached to the sample container with a wire around the container neck through a reinforced hole in the tag. All tag entries must be made with a waterproof, permanent ink pen.

Response:

The laboratory's procedure is to assign a bottle specific tracking code when the samples are entered into their LIMMs system. Sample tags are used by CLP laboratory. The procedure for tracking samples per individual sample container has been included in the QAPP.

Volume 5, Section 6.1, Field Instrument Calibration, Page 1

84. This section of the QAPP states that, "field instruments include pH, specific conductivity, DO and redox." However Appendix B of the QAPP does not include the calibration information for redox. Additionally, Appendix B does include information for a photoionization detector (PID) and a flame ionization detector (FID). Clarify if such instrumentation are to be used and ensure that the QAPP provides the correct and consistent information with the text and attached appendices.

Response:

The QAPP has been revised to include the calibration information for redox. The work plans have been revised to indicate that an FID may be used in leiu of a PID if appropriate.

Volume 5, Section 8.2, Laboratory Quality Control Checks, Page 1

85. This section of the QAPP identifies the internal QC requirements for each method. However, the information provided includes internal QC checks that are not associated with any of the parameters to be analyzed. For example: "endrin/DDT degradation checks" and "second, dissimilar column confirmation" are QC checks generally associated with pesticide/PCB analysis, which are not parameters of interest for this sampling event. Since the QAPP is to be used as a reference to the specific sampling Work Plans, ensure that the information provided is only pertinent to the sampling to be performed at ISG.

Response:

The QAPP will be revised to include only site specific requirements.

Volume 5, Section 9.2.2, Procedures to Validate Laboratory Data, Page 5

86. The QAPP identifies criteria parameters to be evaluated during a data validation but does not provide the actual criteria the qualification is made on the data. Revise the QAPP to specifically provide the data validation procedures. References to the National Functional Guidelines for organic and inorganic data are acceptable and a written validation procedure for each that is not included in the National Functional Guidelines must be provided in the QAPP.

Response:

The QAPP has been revised.

Revise the QAPP to indicate that the validation procedures specify the verification process of every QC measure used in the field and laboratory.

Response:

The QAPP has been revised.

Volume 5, Section 9.3. Data Reporting, Page 7

87. As per the requirements outlined in *RCRA QAPP Instructions, U.S. EPA Region 5* and *EPA QA/R-5*, the QAPP should be expanded to identify any other records and documents applicable to the project that will be produced, such as audit reports, interim progress reports, and final reports. Specify the level of detail of the field sampling, laboratory analysis, literature or data base data collection, or modeling documents or records needed to provide a complete description of any difficulties encountered.

Response:

Comment noted.

Volume 5, Section 9.3.2 Laboratory Data Reporting, Page 7

88. As per the requirements outlined in *RCRA QAPP Instructions, U.S. EPA Region 5* and EPA *QA/R-5*, the QAPP should be expanded to include the following in a laboratory data report:

- Gas chromatograms
- Mass Spectra
- QC forms and raw data
- ICP, AA and graphite furnace data outputs for metals and thallium data
- Interelement correction data
- Method and instrumental detection limit results.

Response:

A Level IV data package will be provided by the laboratory. The QAPP has been revised.

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PARAMETER LIST

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ANALYTICAL PARAMETERS FOR GROUNDWATER SLAG, SOILS, SEDIMENT AND SWMU WASTE

I. Purgeable Organics (Volatles

Acroleoin	1,2-Dichloropropane
Acrylonitrile	1,3-Dichlororopane
Benzene	Methylene Chloride
Toluene	Methyl Chloride
Ethylbenzene	Methyl Bromide
Carbon tetrachloride	Bromoform
Chlorobenzene	Dichlorobromomethane
1,2-Dichloroethane	Trichlorofluoromethane
1,1,1-Trichloroethane	Dichlorodifluoromethane
1,1-Dichloroethane	Chlorodibromomethane
1,1-Dichloroethylene	Tetrachloroethylene
1,1,2,2,-tetrachloroethane	Vinyl Chloride
Chloroethane	1,2-trans-Dichloroethylene
2-Chloroethyl vinyl ether	bis (Cj;loromethyl)ether
Chloroform	

II. Base/Neutral Extractable Organics Semi Volatiles

1,2-Dichlorobenzene	Fluorene
1 ,2-Dichlorobenzene	Fluoranthene
1 ,4-Dichlorobenzene	Chrysene
Hexachloroethane	Pyrene
Hexachlorobutadiene	Phenanthrene
Hexachlorobenzene	Anthracene
1,2,4-Trichlorobenzene	Benzo {a} anthracene
bis (2-Chloroethoxy)methane	Benzo {b} fluoranthene
Naphthalene	Benzo {k} fluoranthene
2-Chloronaphthalene	Benzo {a} pyrene
Isophorone	Indeno {1,2,3-c,d}pyrene
Nitrobenzene	Dibenzo {a,h} anthracene
2,4-Dinitrotoluene	Benzo {g,h,I} perylene
2,6-Dinitrotoluene	4-Chlorophenyl phenyl ether
4-Bromophnyl phenyl ether	3,3 — Dichlorobenzidine
bis (2-Ethylhexyl)phthalate	Benzidine
Di-n-octyl phthalate	bis(2-Chloroethyl)ether
Dimethyl phthalate	1,2-Diphenylhydrazine
Diethyl phthalate	Hexachlorocyclopentadiene
Di-n-butyl phthalate	N-Nitrosodiphenylarnine
Acenaphythylene	N-Nitrosodimethylamine
Acenaphthene	N-Nitrosocli-n-propylamine
Butylbenzyl phthalate	bis (2-Chloroisopropyl)ether

III. Acid Extractable Organics

Phenol	p-Chloro-n-cresol
2-Nitrophenol	2-Chiorophenol

4-Nitrophenol	2,4-Dichlorophenol
2,4-Dinitrophenol	2,4,6-Trichlorophenol
4,6-Dinitro-o-cresol	2,4-Dimethylphenol
Pentachlorophenol	

IV Metals

Antimony	Mercury
Arsenic	Nickel
Beryllium	Selenium
Cadmium	Silver
Chromium	Thallium
Copper	Zinc
Lead	Iron
Vanadium	Cyanide
Molybdenum	Tin
Manganese	

V. Miscellaneous

Total cyanides
Total phenols